



INDUSTRIAL-ARTS MAGAZINE

Incorporating: **HANDICRAFT** and the **ARTS AND CRAFTS MAGAZINE**

Published Monthly by

THE BRUCE PUBLISHING COMPANY, Milwaukee, Wis.

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MILWAUKEE: 129 MICHIGAN ST. **New York:** 3 East 14th St. **Chicago:** 53 W. Jackson Blvd.

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Entered, January 20, 1914, as second-class mail matter in the Postoffice at Milwaukee, Wis., under the Act of March 3, 1879.
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SUBSCRIPTION INFORMATION.

The subscription price of the MAGAZINE is \$1.50 per year, in advance. Postage for Canadian and Mexican subscriptions, 35 cents; for foreign countries, 50 cents. Single copies, 25 cents.

Notice for the discontinuance of subscriptions must reach the Publication Office in Milwaukee, at least fifteen days before date of expiration, with full balance due to date. Notices for changes of address should invariably include the old as well as the new form of address.

EDITORIAL CONTRIBUTIONS.

The editors invite contributions of all kinds bearing upon the Industrial-Arts Education, Manual Training, Art Instruction, Domestic Science, etc. Unless otherwise arranged for, manuscripts, drawings, projects, news articles, etc., should be sent to the Publication Office in Milwaukee, where proper disposition will be made. The Board of Editors meets once or oftener each month in Chicago, and everything submitted is given careful attention. Contributions when accepted are paid for at regular space rates. In all cases manuscripts should be accompanied by full return postage.

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INDUSTRIAL-ARTS MAGAZINE

Vol. V

MARCH, 1916

No. 3

THE MANUAL TRAINING IDEA

Sandy Morrow Kane, Instructor in Metal Work, University of Washington



LABOR is the asset of the large majority of all peoples. On the money value of a man's labor depends much of his happiness and the happiness of his family. The money value of a man's labor is controlled by his initiative and ability. When an employer speaks of a man's initiative, he means that the man can do the right thing without being told. When he speaks of his ability, he means that when he is told to do a thing, he can do it satisfactorily. Our schools should give to the boys both initiative and power to do. It should give them knowledge, and a pliant mind—the tools which must be handled in the various tasks they will be called upon to perform.

One of the most effective movements toward equipping boys with these qualifications to be found in the sphere of education today is in the development of the manual side of the curriculum in conjunction with the intellectual side.

From 1645, when the Marquis of Worcester, at the time of his imprisonment in the Tower of London, gave orders for the purchase of a lot where he hoped to establish a school for boys' industrial training, to the establishment of the professorship of railroading in Harvard University recently, history and the literature of education reveal that the problems of industrial education have occupied the minds of those striving for the betterment of the living conditions of the human race.

It is nearly 250 years since England was advised by her parliamentarians how to become superior. "Let us sharpen the wits of our people," she was urged. "Bring men from the Mechanics' Universities of Germany and Holland for the training of men in the industries. Let men from Freiburg put them in the way of making tapes. Let others from Dort show them how to make fine threads. Bring spinning mistresses to govern our girls and teach them the art of spinning, and have Haarlem men give them the secret of whitening their tapes and threads." They were to become masters by being directed by masters. An industrial school was urged in every parish, and readings and notions alone in the development of the people were spoken of as "but husky provender."

In our own country, in 1847, The Lawrence Scientific School of Arts was established in Harvard University. The wave of discussion regarding industrial education in our elementary schools which passed over the

educational world some thirty years ago, can be recalled by many of us today.

But you will remember, too, that those discussions were carried on in a mystifying way peculiar to the pedagogue. What he said about the benefits of all-round development of the child could be grasped only by those in close touch with him. To what he proposed as a practical way to carry out his ideas only the converted were willing to cry "Amen."

It is a most favorable sign in the educational world today that educators are beginning to speak in plain English; that they are laying aside their cloaks of superior virtue; that they are leaving the realm of boredom and are becoming so interesting that the parents of all the children can understand them and often anticipate their movements for the betterment of educational work.

In the universal discussion of industrial education and the welfare of the child, many poorly-formed and ill-balanced opinions certainly will be set forth. The best in all the fields of man's activity has been developed out of experience. This is an age of specialists and to the educational specialist should be given the task of leading and directing the organization and work of our educational systems.

I am not assuming the virtue of an educational specialist. I am one with the blood of a long line of manufacturers in my veins, and the product of a dame's school; one of a large class of industrial workers who, thruout life, has wished that educationalists had been better experts.

As a child, I suppose I should be classed with what today is known as a "repeater" among school children. At any rate, I went over practically the same ground every year of my school life until I was 13 years of age. I had none of the tendencies of the incorrigible repeater, none whatever. The dame liked me. She punished me once but made amends for it with a generous slice of bread and sugar. For intellectual food, she gave the multiplication tables which we chanted, wrote in rows, said in rows, and occasionally skipped about in. As an appetizer for this mental pabulum, we periodically prepared for the inspector, when we droned in concert the lines of poems, such as that famous one, "John Gilpin was a citizen of credit and renown."

Imagine this with the whirr of the belts and machines of my father's factory in my ears, and the knowledge that new, wonderful things such as the first bicycle in all Ireland, were being made there every day,

and that the longing to have a hand in the construction was the strongest desire within me! I had the pleasure of delivering a bicycle to the boy who is now Sir George White. It was a pleasure as I now view the incident but an emotional tragedy on the day of the delivery—for I wanted the bicycle myself.

The escape came from the school prison bench only when I was thrown into greater bondage—a seven-year apprenticeship under bonds, to serve my father in a trade that was hateful to me. But a foreman from the family of boys was needed in that branch of the factory and fate, or ignorance, selected me. Twice bringing back by the long hand of the law during my apprenticeship did not convince me that I was on the right track for life, for individual happiness. At 20, I had completed my time but I have never worked an hour in that business as a trade from that day to this.

There is no parallel between the educational advantages of a boy of my time in that country and a boy of today in this country. Where I had barrenness in incentives, he has wealth. Where I had a dame, versed in the proper thickness of a tea-cosey, he has trained men and women as teachers. There is no cultural subject that he cannot pursue. He has all the trades or nearly all, from which to make a choice, and in which to make a beginning. But in spite of these things, I find from the report of the Superintendent of Schools of Cleveland, Ohio, that \$26,000,000 is spent annually in the schools of the United States on "repeaters," so there must be a considerable number of them. I also find that our boys still drop out of school long before they should and that businessmen and captains of industries brand our finished product, "inefficient." Nevertheless, all are agreed, that we are approaching, in many communities, an ideal and practical solution of a portion of the problem of education for what are to be the rank and file of our future citizens.

It is manual training, trade education, industrial education, or vocational education, whichever term best suits your grasp of the subject that I know most about. From my observation and experience, I believe it is in that phase of education that the greatest mistakes are being made today. We are chanting the multiplication tables in vocational training, writing them in rows, saying them in rows, and occasionally skipping about in them. Here and there a John Gilpin poem is offered as an appetizer.

Let me point out a few of my observations. I believe the people as a whole have passed beyond that stage, where they seek to avoid work requiring the skill of the hand. They have come to know that the brain behind the brawn of the workingman's hand is as often responsible for the progress of an industry as for the supposed greater mentality of the few. To toil is not such a disgrace these days and more intelligent toilers are going out from our schools every year because of the training which is being given there. But there is yet a stigma attached to a pair of dirty overalls, broken finger nails and a begrimed person. Why? Because educationalists have paved a beautiful highway, over

which the boy travels, and every disagreeable feature of the road is removed to the end of the journey. He leaves the elementary school, the high school, or the university with a very false idea of the calling he thinks he will pursue. Thousands are unwilling, because of the fastidiousness of the job as it was practiced during school years, to get down to it in a garb suitable for commercial and industrial pursuits. Work that hitherto has been easy and interesting as a diversion, is now rough, hard and mean.

It is a mental shock to the boy that he is called upon to do work that is not definite; that he is not given clearcut directions. Hitherto his work has required a good memory and obedience to instructions. That indefinable quality, called judgment, necessary to meet a new situation and handle it with common sense has had no chance of development. Formerly, he put in one hour of the school week on type exercises. In one grade, with a scroll saw, he made a hobby horse, after a well-executed design by the teacher. In another he made a joint about which he knew nothing, and so on.

Manual training ideas, like many others, go tandem. Following the type exercise idea came the "originality in expression and design" idea and our schools turned out monstrosities in design and workmanship. Now the fashion is large pieces of furniture, the greater part of which is made in the mill and our schools display the finished articles with at least an outward show of pride and satisfaction. Much of the work is above the capacity of the boy. In the production of the articles, very little consideration, if any, is given to the value of time and cost. There is a pleasant ambling thru the entire course in manual training that should call down the severest criticism from men in the industrial world.

We cannot say that manual training in the schools has nothing to do with a boy's learning a trade and that it does not predispose boys to enter mechanical pursuits, no matter what was the intention of educators when the subject was first introduced. It has to be recognized as a factor in the choice of vocations, in the industrial welfare, and in the cultural side of the education of boys and girls.

Conditions in the classroom are different from those in the shop it is true, but modified shop practices should be followed in every manual-training room in the schools. Time, cost and utility should be considered in every article made. Co-operation in the handling of raw material, in the design of the article to be made from it, in its construction and finally in its disposition, should be a factor in all the work.

I imagine someone will say "this smacks of the factory." It is quite true, it does. But where is the man who is big enough to eliminate the factory idea from the industrial world? Doubtless many of our boys will become a part of this violent whirl of factory life. Will they lose anything of the cultural value of their manual training if they are taught that their work must have a standard of quality, and their output must be sufficient? These are the tests of the industrial world, and if they are not met dismissal follows, and

someone is ready and willing to step into the place made vacant.

This modified shop idea is not new. It has been found practical in many places in the province of Ontario, in Gary, Indiana, in Rochester, New York, and in many others that could be named. Every article made in these schools has a market value and many of them are used in the equipment and furnishings of the schools. In the manual training rooms, work must be done on time, orders of superiors must be obeyed, personal whim and fancy do not enter into the work. Economy of the material used and the character of the finished product are as closely standardized as if they were competing for the world's markets.

We do not have to go abroad to find prophets with honor in the manual-training schools. I visited a manual-training school in Everett. There they give half-time to industrial education and half-time to academic subjects. They are revitalizing the course of study—cutting out non-essentials. They are chanting less on formulas, but the pupils are mastering them just the same because they are making practical use of every one they are required to learn.

The manual-training teacher in Everett, with eighteen of the boys from school shop, did \$1,500 worth of work for the Board of that city, during the month of August, at a cost of \$1,000. The boys were paid from 15 to 25 cents an hour and the teacher was paid a regular overseer's wage.

If modified shop practice does nothing but prevent boys who have not a single mechanical instinct in their heads, from continuing a mechanical education in our higher schools, it will have accomplished a distinct purpose. Mechanics are like poets. They are born, not made. Our manual training should have such a solid scheme for its foundation that a boy would know at 14 or 15 if he had in him the "mechanical germ." He would know that with his limited ability and limited education, ten chances to one, he would find the level of the commonest laborer in the industrial world. He would be able to see why certain academic studies, along with vocational work practically done, would give him a foundation for becoming a skilled workman in a much shorter time when he finally did leave school. He would be carried over the two years in which a boy becomes a good-for-something or a good-for-nothing, and would have acquired a mental and manual equipment that would enable him to find joy in his work and surroundings.

Before the manual or industrial idea shall have fulfilled its mission in the schools, it must have put into the organization something that will take the place of the old system of apprenticeship. When some system is worked out thru the co-operation of the educators, the trades unions, the employers and the state, it will be based upon the ideal of effective living. When American industries and workmen begin to figure their economic waste in terms of the stolen trade some definite law in regard to apprenticeship will be made and enforced.

Boys should be taught that they cannot steal a trade. If a boy has finished the manual-training course and it has not given him an industrial elasticity to pass rapidly from a lower to a higher branch in his chosen vocation, it has failed in its purpose. It has also failed if the boy gets the idea that his school course, especially if he has finished the higher schools, has fitted him for nothing short of supervision, or that a clever fellow needs only to make a bluff to land a lucrative position. One student put the case to me this way. I inquired what he anticipated doing when he finished his university training. "Well," he replied, "I suppose I'll have to make a stagger at a shop. I'll do this to get into the good graces of some workman who will tell me all he knows in a few weeks, a few months, at the least," he added modestly, "and then I'll strike the boss for the superintendency of the shop!" This is an exaggerated case, but the opinion is common enough among technical students to be suggestive.

Another example will not be out of place here. At the beginning of this school year a young man was enrolling in the engineering school. He is a graduate of a high school of a large city in a neighboring state. He came to get my approval to drop the shop practice because he had had shopwork in his high-school course. He had spent 32 full working days at the business and was convinced that he could afford to give it no further time because of his academic studies. I asked him what he intended to do at the close of his university work. "Well, I hope to qualify as superintendent in some engineering field," he replied. Continued discussion with the young man convinced him that he needed the shop practice in the university course, and he will have at least a dozen more full working days in the shop to his credit, before he becomes superintendent of one.

The time given to practical work in the manual-training courses does not qualify a man for anything. The boys should know that no matter from which school they enter the actual trade, or engineering field, that they must expect to begin at the bottom. Their ability and intelligence will control their advancement in the mechanical world just the same as in the business world.

A young man graduated from our engineering school and went to work for a large concern. He came to me and said that he was sorry he had spent so much time in his course; that his education had not qualified him for as good a salary as boys who had begun with the company when they were 14 years of age. He was dissatisfied to begin where they had begun. His intellectual training had unfitted him for it. The company put slight value on his diploma at the beginning of service with them. Had he stayed by his "job" there is no doubt that he would have reached the "position" rank in a much shorter time than did the boys who left the schools at the elementary stage. He quit his job and accepted a *position* in a manual-training school.

The subject of teachers in the manual training schools must be approached cautiously. I find, in reviewing the manual training idea, that educators themselves are dissatisfied with results obtained from pursu-

ing the subject either as a cultural one or with the utility idea.

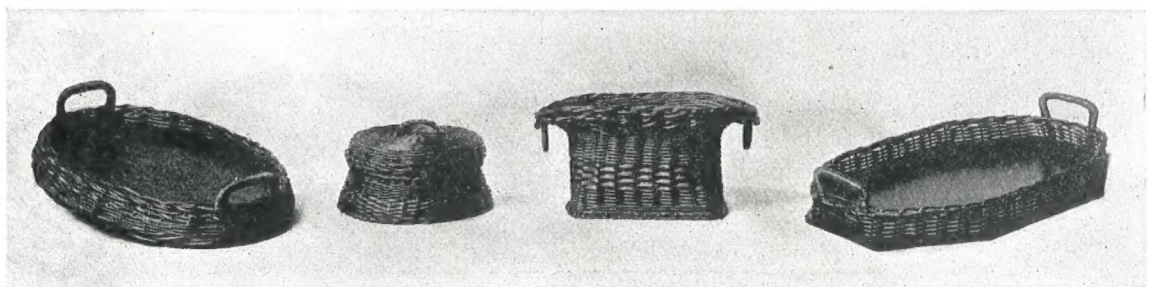
Dr. Suzzallo spoke before a large body of efficient teachers in the Seattle Schools a few weeks ago. He said in part: "We cannot train children in a world in which we have never been. We have had little social experience and little communion with common men and women. We must become readers of social and political problems. By direct experience we are lacking and we should become constructive students of the social world. Once we substitute the social point of view for the traditional one in the construction of our school systems, we shall make the school of larger service to the world."

Dr. Suzzallo struck the keynote in the manual training problem in those words. Boys cannot be trained for a working world if the trainer is lacking in experience in that world. Long experience in the industrial world should be the first qualification of our manual-training teachers. They should be what our navy department calls "all-round men." Now an "all-round man" does not mean a handy man. It means a man who knows raw materials, who can select from the raw materials the kind suited to the job, change them to suit the work he is called upon to construct, lay out the work, finish it on any or all machines in the equipment, assemble it, and finally when all is done, it must stand the test of government inspection.

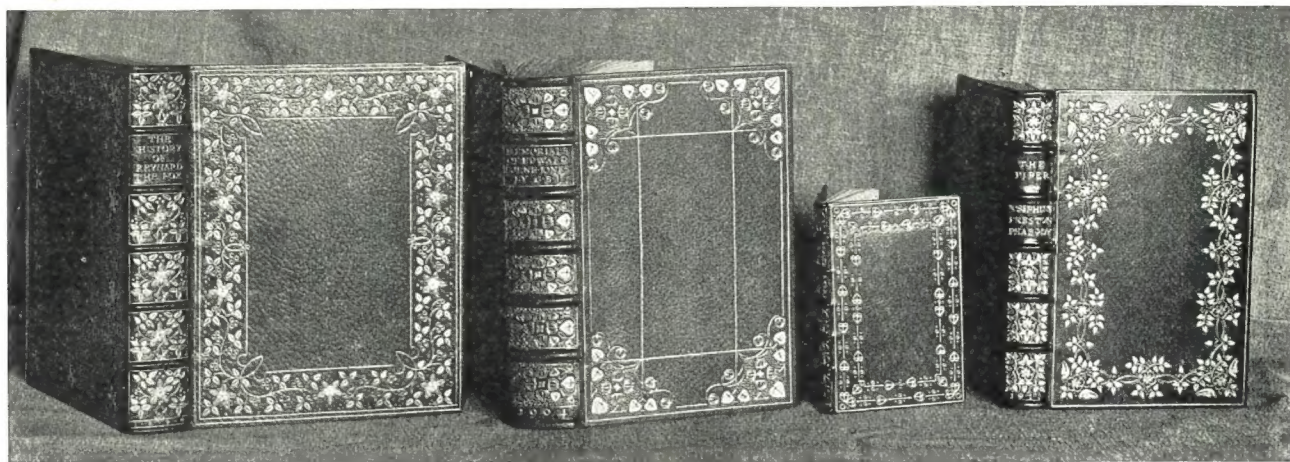
If a man does go into the schools equipped for the right kind of service there, he will soon rust out in parts, get behind in methods and processes, and even in the so-called "tool knowledge" we hear so much about in relation to manual training, unless he makes frequent excursions into the practical shops. There is no avenue

for the activity of man where changes come so rapidly as in the industrial world. Tools and methods become obsolete there the same as in educational work, with this difference: The industrial world recognizes no traditions. If a process or a tool is useless, out-of-date, unsuited to existing conditions, it goes into the scrap heap no matter what it cost or the place it held in the industrial past.

The industrial idea for the future welfare of the child will soon be walking abreast with the academic idea. It will not be called an educational frill. It will not rob the polite professions, or business, of a single man with natural qualifications for such activities. The trades will get those who have natural qualifications for those lines. The state will be equipped not only for giving the child a practical knowledge of books. It will have scrapped the non-essentials in books, for it will have demanded a living substance in them. History will magnify the story of achievement and not of destruction. Hero worship will be of men and women who have aided the farmer, inspired the builders, threaded our lands with steel rails, conquered the air and the waves, and those who have striven in every cause for the benefit of mankind. When the state is equipped to make good farmers of some of its boys, good builders of others, machinists, electricians, and other kinds of skilled workmen, it will have sought and obtained the co-operation of the industries peculiar to the community in terms of the child; it will have expert men from these practical fields in its manual training rooms; it will have expert men as vocational advisers for boys in every school district, and the parents of all the children will rejoice in the added security afforded against the two great social evils, ignorance and idleness.



Baskets Designed and Made by Students of Mr. F. D. Davis, Instructor in Manual Training, Hayward High School, Hayward, Wis.



Work of former pupils of the Author. Left to right. (1) By Mr. Peter Verburg. (2). By Miss J. S. Lovejoy. (3 and 4). By Miss C. C. Vawter.

BOOK BINDING

Ellen Gates Starr, Chicago, Ill.

(Article 4)

"Tooling" or "Finishing."



AFTER the covers of the full bound book are "crushed" and the back polished it is ready to be decorated. It is only the well bound book which has any claim to decoration. Heaping ornamentation upon a cheap and shabbily made book is like covering a coarse and cheap garment with embroidery. One of the services which good handicraft binding has done for commercial binding is to teach this canon of taste. It is now unusual except in the case of novels, to see decoration on commercially bound books. Dignified commercial books are usually bound in plain cloth, with simple lettering of the title and nothing else. It was quite usual a generation ago to cover books of poems, etc., bound in cloth, with senseless filigree mechanically applied.

The proper decoration for a leather bound book is technically called tooling or finishing and is of two kinds, "blind" tooling where gold is not used, and gold tooling. The pattern on a commercial book is made by putting it upon a plate and stamping it off upon the cover in one stroke. This is the only way in which thousands of copies can be turned off. The hand bound book is a very different matter; each copy is a special creation and it is presumed that a book is not thus especially bound unless it has some value either in itself or personal to the possessor.

"Tools" technically in bookbinding are the implements for putting the decoration upon the book; "tooling" is the process of doing so. The tools are little dies of metal set in wooden handles (Fig. 19). They are heated and patterns are stamped with them in the leather by a process presently to be described.

The "tools" and patterns of a handicraft bookbinder are personal to him and should no more be appropriated by others than any other sort of design. The tools are made to order from drawings which he furnishes the tool cutter. The most useful tools for designs are simple forms such as a conventionalized leaf, flower,

or part of a flower, which can be used in a great number of combinations. The more elaborate and intricate a tool is the less frequently it can be used. An amateur craftsman often makes the mistake, in the beginning, of making his tools too interesting in themselves. A complicated lily, for example, can be used only two or three times, perhaps; a picture of a ship still less often. One cannot cover a great variety of books with a lily or a ship pattern without becoming monotonous, and the more naturalistic the tool design is the less often it can be used. Besides a few simple, fundamental forms, a considerable number of gouges, i. e., of curved lines of various lengths and curves, and of straight lines, are required; also dots and circles. With this equipment, and a pencil, a pattern is made on a handmade paper, which is strong enough not to be broken away by the pressure of the tools, thru it upon the leather. Figures 20, 21 and 22 show such patterns. The lines are first drawn with a pencil, and then fitted by the gouges of various lengths and curves. The tool forms are roughly drawn in with the pencil; and when placed as desired, the tools are blackened in the smoke of a candle and thus exactly transferred to the paper. As the medium is rigid, freehand drawing or any attempt at naturalism on book covers is in bad taste. The more formal, conventional and balanced the designs are, the better fitted to "tooling." This, of course, does not imply that they need be without grace and charm. The French binders, tho the greatest technicians, especially in tooling, often make the great mistake in taste of attempting representations and illustrations on the covers of books, which is bizarre. An inlaid lady with an inlaid parasol, the dress and parasol of different colored leathers, tho perfect in technical accuracy, borders on the outré. Since the pattern should have symmetry, accuracy may be obtained in the following manner. The paper is cut to the exact size of the cover, is folded in half twice, vertically and horizontally. One angle is also bisected by a fold. The pattern is begun in the corner.

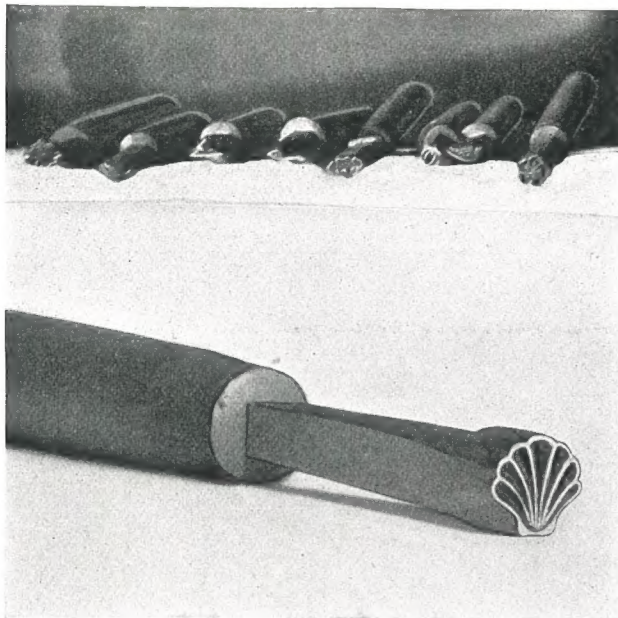


Fig. 19. Book "Tools."

Supposing it is to be a border, such as Figs. 20 and 22, the design is drawn in from the line folded to bisect the angle, to the line bisecting the paper vertically. The tools and gouges are then blackened by smoking them in a candle, and sharp black outlines of them are stamped upon the paper between these two folds. The paper is then again folded inward at the bisected corner and with a bone folder, rubbed on the back so that the black of the candle smoke is transferred. The corner pattern is now complete, to equal distances from the central line. The rubbing can be reinforced by blackening and applying the tools a second time, taking care to put them down precisely so as not to blur the pattern. The sheet is now folded again, this time in the fold bisecting the sheet horizontally, and the rubbing process repeated. A second time reinforcing it with the blackened tools,

it is folded a third time, now in the lateral bisection, and again rubbed off. It will be seen that the border is now complete with the exception of the space at the sides in Fig. 22, representing the distance by which the book is longer than its width. This is now composed and filled in on one side and transferred by the same method to the other. Had the pattern consisted of corners only, it would have been complete without the last step. A diaper pattern may be treated similarly as regards transferring one side to the other, but if the unit is not symmetrical both ways it must be managed differently. See Fig. 21. The poppy seed pattern is symmetrical laterally but not vertically. Each designer has his personal methods for these details. The above sufficiently suggests the general treatment on its mechanical side.

It may be said of designing for books, as for many other, perhaps for all other crafts, that it is impossible to do it well without knowing the medium. General principles of design may be well taught, but quite obviously a design which is suitable for embroidery or wood carving might be wholly untranslatable into gold tooling, and even if it were possible, wholly inappropriate as in the case I have cited above.

The pattern duly made, it is now time to execute it. The paper is attached by a little paste to two corners of the book, perhaps three. I always leave at least one corner unattached that I may peep under and make sure whether all the tools have been struck. Care must be taken not to use too much paste, for it sometimes discolors the leather and sometimes the surface comes away with it when the paper is taken off. The tools are heated in the finishing stove, shown in Figs. 23 and 24. Like the polishing iron and the crushing plates, the tools should ordinarily be used at the point at which they cease to hiss, when moistened. But the degree of heat varies with the quality of leather and also with the moisture of the leather and of the atmosphere. The greater the moisture, the cooler the tool should be. The

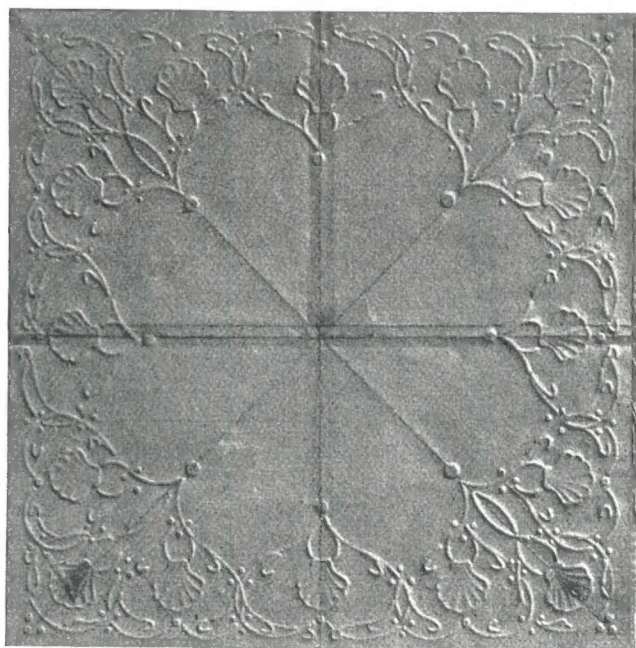
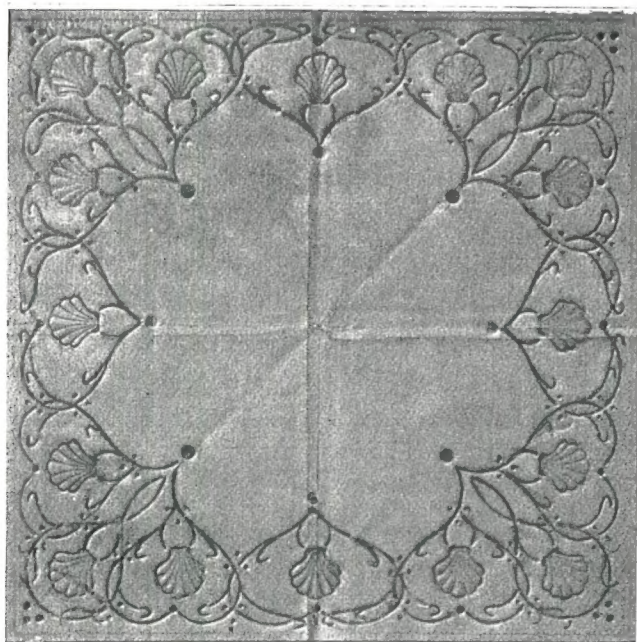


Fig. 20. OBERSE AND REVERSE OF PAPER PATTERN FOR BOOK TOOLING.

right relation of these component factors is learned by more or less costly experience. Of course, one does not begin tooling lessons on a book but on a practice board, made by pasting waste scraps of leather on waste scraps of mill board and crushing it slightly. Experiments are first made with separate tools and letters before it is worth while even to make a pattern.

The pattern attached and the tools heated, the latter are applied to the intervening paper and pressed thru it into the leather. A smooth, thin but tough handmade paper is the best. The position of the hand in grasping and applying the tool is seen in Fig. 23. The thumb of

straining it thru a bit of cheesecloth. A little more vinegar may be added if it becomes too thick and the glaire again strained. It will last weeks if covered and if the heat is not great.

The glaire is now carefully applied to the tooled surface with a camel's hair brush, taking pains to touch every point of the tooling without slopping it about on the untooled part. It should not be allowed to stand in little pools but be put on as evenly as possible. If one part is much moister than another there is danger of burning it with the tool. After the first application of glaire has dried, the process is repeated. When the

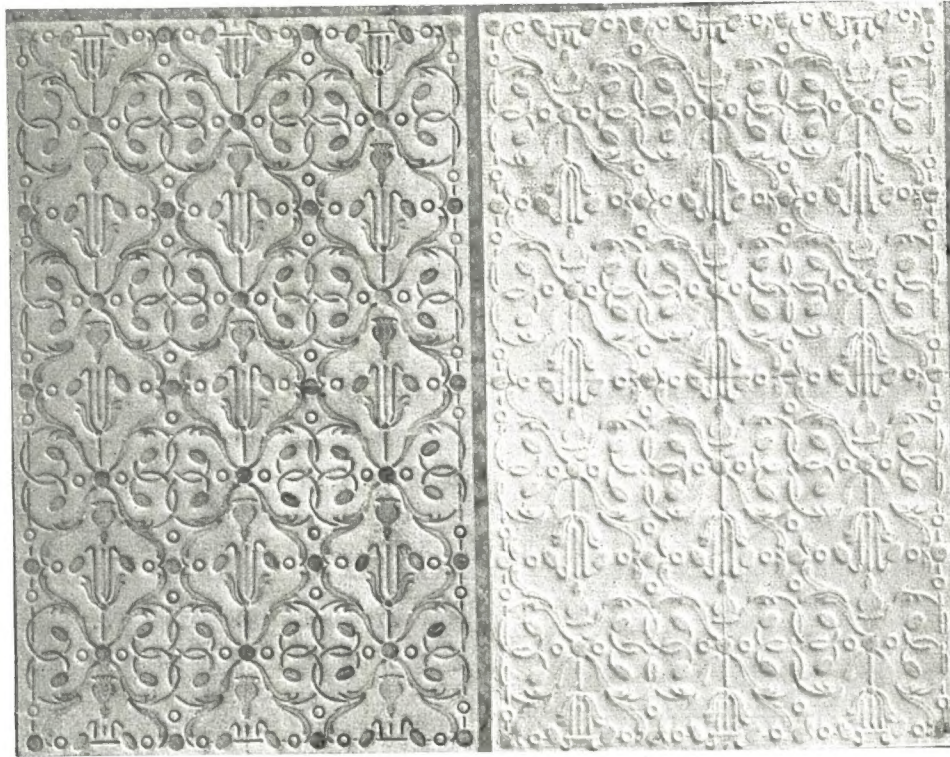


Fig. 21. OBTVERSE AND REVERSE OF PAPER DIAPER PATTERN FOR BOOK.

the right hand is held on the top of the handle, and that of the left is used to steady the tool in putting it down. The tool should be held firm and slightly rocked back and forth once only, to touch each point, i. e., if it has some extent of surface. A dot or circle obviously does not require this movement. And in any case the movement in each direction should not be repeated. If the tool is wagged back and forth, each time incurring the risk of not going back into the same place, the impression is sure to be ruined.

The impression thus produced is called "blind tooling." Usually the first impression is not quite sharp enough and requires going over again with the tools after the paper is removed. This blind tooling is slightly washed over with vinegar, with a very little paste in it. (For white pig skin, which would be stained by the vinegar, paste water is used). It may be applied with the glaire brush. After that has become dry, the glaire is applied. Glaire is made by thoroly beating the whites of eggs—say three at a time, for two or three persons' use,—adding a teaspoonful of vinegar, letting the substance stand for some hours, and then

glaire has become dry, superficially, for the second time (it ought not to remain dry too long) the gold is applied. Gold leaf is bought in little books at a gold beater's and the necessary appliances for using it are a leather gold cushion, a gold knife, (long, straight and not too sharp) some cotton and an oil. Palm oil is rather the best, but if it is not to be had, cocoanut oil will do. Olive oil dries too fast and lard, which dries slowly, does not give a bright impression. Perhaps a little lard and a little olive, thoroly mixed, might answer if the others could not be had. If the atmosphere is very damp and a small surface is done at a time, olive oil alone may answer the purpose.

A single sheet of the gold is now laid flat and smooth upon the cushion. That is to say, the novice *attempts* thus to lay it there. The probabilities are that the first few attempts are crowned with little success and the sheet crumples and blows about and ends on the floor. When picked up it sticks to the unfortunate's fingers, becomes worse crumpled and at last disappears in too fine a ball to be seen. Courage! There are different ways of proceeding. Either the knife is held

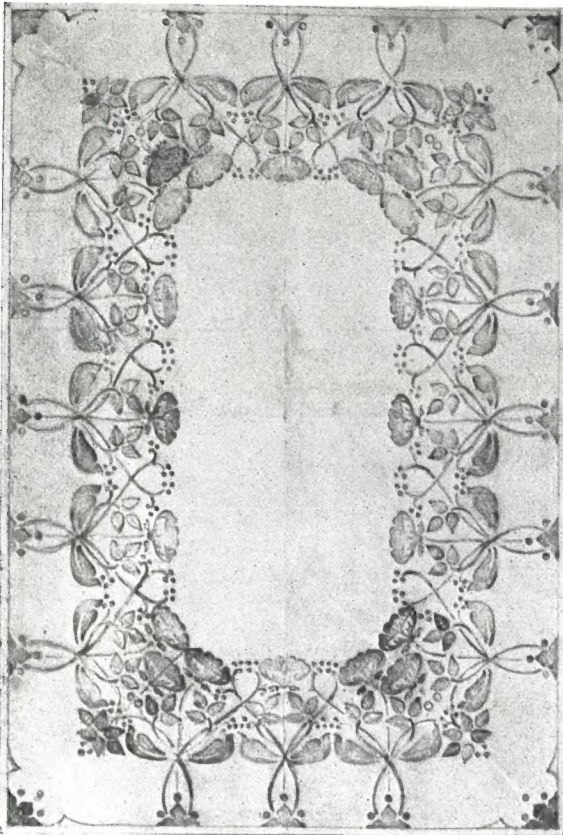


Fig. 22.

across the middle and the sheet blown across it, very gently, and then blown off again on to the cushion, or the book is opened carefully and laid over upon the cushion, and then lifted off, leaving the sheet there. If it lacks a little, as is usual, of being quite smooth and flat, one blows gently upon it exactly in the center. If the breath is obliquely directed, the last state of the sheet of gold is considerably worse than the first. When it at last lies flat, it is cut with the gold knife into pieces of the size and shape desired. A good sized pad is now made of smooth and good cotton batting and another small one. Some of the oil is rubbed in the palm of the left hand to melt it, if solid, and the small cotton pad absorbs it, and with this piece of oiled cotton, the surface to be tooled is rubbed over to make the gold adhere to it. The second and larger piece of cotton wipes off what oil remains on the palm, as this piece should be only sufficiently oiled to take up the gold. It is carefully, and with even pressure, applied to the piece of gold to be lifted and the gold, which should remain as flat as possible on the cotton pad, is now pressed very gently and without any lateral movement, which would crack it, to the oiled surface of the leather. The gold sinks down into the tooled depressions and they should, if sharply defined, be plainly seen. As it is very rare that no cracks at all are made in the gold, it is necessary to cover each part of the tooled surface twice. Before putting down the second piece, the first must be quite closely adhering. If it is not, one blows upon it a little with a moist breath, close to it, and pats it down with the cotton. Then the

second piece of gold must be laid on without disturbing the first.

The heated tools are now applied to this impression, one by one. If they do not coincide, accurately, with the first impression, the result is a failure to the extent of the lack of coincidence. If it is considerable and the first impression has been strong, it shows to one side and looks, as my master was wont to say, like a galosh, slipped in the mud. Letters are more difficult than any other tools because the slightest inclination in one direction or another is very noticeable; whereas a leaf, turned slightly one way or another, may not strike the eye at all. Long, straight lines are made with a wheel (Fig. 24), the line being first made with a bone folder, guided by a ruler. When the surface has all been tooled, it is rubbed over with a piece of flannel (by the present writer) and the superfluous gold removed. Frugal binders use crude rubber, prepared by soaking in petroleum which takes the extra gold up into it. When the piece is quite filled and will hold no more, it is sold to the gold beater who melts the rubber out. If the gold always stuck where it should stick and came away where it should not, how merry and diverting a process would gold tooling be! To rub off the surface and see one's lovely pattern smiling before one in all its gay brightness—how complacent a sensation! But, alas! that the next paragraph heading must be the prosaic word Patching.

To patch the parts needing reinforcement, if they need it only moderately, one simply reglaires, once, and lays the gold on again. But if so much is wanting that the portion must be gone all over anew, it is washed over with vinegar and a piece of cotton, removing as much more as comes off thus being weak, and the process is all repeated. Each time of patching there is a little more danger of blurring and a little less proba-

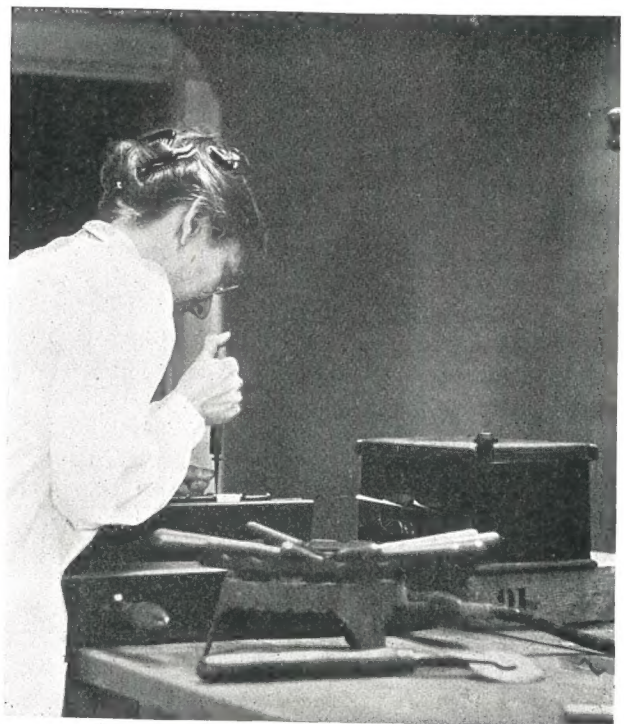


Fig. 23. Lettering the back of a book. Stove, tools and gold cushion shown.

bility of ever getting a really clear and handsome impression. If the leather is burned outright, so that there is no surface that can be worked upon, the only recourse is inlaying.

For inlaying, leather must be pared very thin. The leather is first wet—soaked indeed. I was taught to pare for inlays with a rather long, thin and straight knife. The leather was cut into strips, narrow enough to allow the knife (not too thin to be stiff) to take in the width in one sweep. The Scotch finisher who taught me to pare for inlays could pare a strip of considerable length in this way to a marvelous thinness, without going thru the leather. But I was never an apt pupil in this process, which requires a strong as well as a firm and skillful hand, and I departed from my instructions in this one particular (as in the process of crushing) and pare for inlays with the regular paring knife. As the pieces required are usually small, it is not fatal if one occasionally does go thru the leather. After the strip is pared and perfectly dry the form required is tooled on it with a warm tool (not hot); is then cut out with scissors unless one has a punch. If the colored inlay is small and corresponds with a tool—such as a leaf or flower, one should have a punch, but the punch must be made of steel as a brass one is too soft and loses its edge. And I have not been able to find a tool cutter in this country who would make them. I have those I brought from London, circles and various flowers and leaves. And I do not make designs requiring very small inlays in the forms for which I have no punches, as the labor of cutting out tiny pieces with scissors is too monotonous. I cannot advise those who must get their tools here. My mechanical readers may be able to overcome this obstacle. The old bookbinders made their own tools. To use the punch the pared leather is laid on a piece of hard millboard and the punch lightly struck with a hammer. After the pieces are cut out their edges must be “feathered,” i. e., beveled to the finest edge, so that there will be no perceptible edge at all after the inlay is tooled over, but the surface will seem to be unbroken. I do this with an oculist’s scalpel, my own device. The inlays are pasted over the tooled depres-



Fig. 24. Tooling a straight line inside of cover with a wheel.

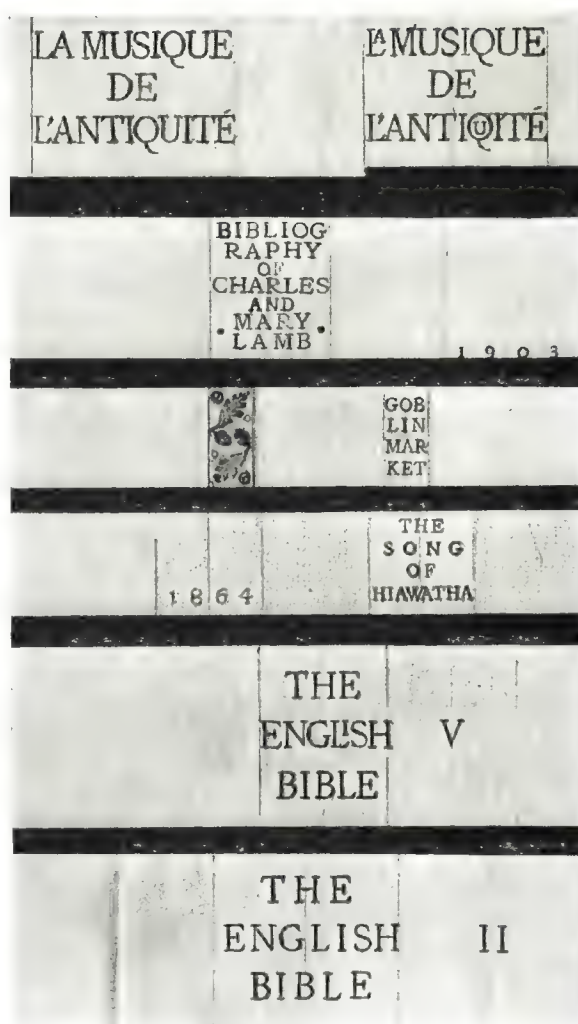


Fig. 25. Paper Patterns for Book Lettering.

sion, pressed in thoroly with the tool, cool; glaire is applied to them as to the rest, the gold is laid on as before, and all tooled as tho the inlay were not there. It is obvious that if the inlay is not tooled around with gouges but a tool, the tool must be an “open” one, or the inlay would not show at all, being covered with gold. Sometimes a blind tooled inlay is effective, but even then the inlaid pieces should have most of their surface raised, not depressed. For an inlaid patch, in case of burning, a small bit may be pared dry. It is always a prudent thing to save a bit of the pieces trimmed off in “filling” the book to use if necessary, the edges being already thin.

Lettering.

Lettering is perhaps the most difficult thing in tooling. In one sense it should have come first, as half-bound books must be lettered while it is quite out of taste to decorate them. But in learning to tool on a practice board, as I have already pointed out, it is better to take tools first, to get the technique of making the gold stick, and to acquire some accuracy, as lettering requires the highest degree of accuracy. Thence I have passed on to combining tools in patterns and must now turn back to lettering.

Commercial binders set letters in a “palette” and stamp the whole title at once. But handicraft binders

use each letter as a separate tool. The pattern of the title must be as carefully made as any part of the pattern. A strip of the tough, handmade paper is cut to the width of the panel, between the bands. The second panel from the top is the right one for the title and the one below it for the name of the author, if that is to be tooled. In some cases the title includes it, e. g. Sonnets of Shakespeare instead of Sonnets, alone, and William Shakespeare in the panel below which would look rather foolish. The arrangement of titles requires a good deal of planning and some taste and, not infrequently, invention, when the title is very long or very short, or the book's shape and size very unfitted to it. One must often try several arrangements of a pattern and several sizes of letters before finding the right one.

As the lower margin of a printed page, and the lower panel of the book's back should be deeper than the others, the space below the title should be a little wider than that above it; were they precisely equal it would look narrower. (This is easily proven in any of these cases by turning the book upside down.) Hence a little space is marked off at the bottom with compass or "straightedge," (ruler) to begin with. Then, if the title is to be in three lines, the remaining space is divided in three, leaving a space at the top a little less than at the bottom; if in four lines, in four. The strip should be folded in such a width as to make sure that the lettering does not run over onto the part of the leather which bends in opening the book, else the gold will crack off. The strip should be folded in the center of the panel thus formed, and each line kept centered. A good eye suffices, but may be aided by the compasses. Counting letters is obviously a very inexact method as an I and an M and O do not at all balance. It is not very desirable to divide syllables, but is sometimes necessary and not altogether forbidden. Sometimes the expedient of using a smaller letter inside a larger, or in its lap, as it were, an i within an O or L, is not disagreeable. But this should not be done merely for the sake of oddity. It should always be remembered that the object of a title is to inform as to the contents of the book, and the more clearly it does so the better. Playing tricks with lettering for its own sake shows a paucity of inventiveness in other directions.

The date of the edition should be tooled at the bottom of the lower panel in the space by which the lower panel is longer than the others. The pattern in all the decorated panels is the same. The binder's signature and date of binding (if there is no design a signature is unnecessary) should be placed on the inside, lower margin of the back cover. The signature usually consists of initials only.

The proper decoration of a book is now completed unless one wishes to go into the elaboration of the "double" or "doublure." The French are very fond of putting watered silks into the insides of their books, a practice which I much dislike. Stuffs of this sort suggest fussy sofa pillows rather than decorous books. Even leather filling the entire inner surface of the cover and tooled over does not seem to me reasonable. The idea of leather is a protection to the book, which may at the same time ornament it. But the protection of leather

is not required on the inside. Decorated papers for the "paste down" and first fly leaves or end papers, are pleasant if the paper is really pretty. Pretty Italian and Japanese papers which are strong enough for pasting down, may be had. Marbled papers are usually excessively ugly. The French binders are much addicted to the use of the ugliest of these—those with glazed surfaces. The idea of the glazed surface is to prevent the discoloring of the paper from the oil in the leather. The paper, unless glazed, will eventually turn brown from contact with the opposite leather. But, to my eye, the brown border of the fly leaf or end paper, with the tooled pattern of the leather border stamped off on it, is rather pleasant—far less ugly than the glazed marble paper used to prevent it. The combinations of a usually crude colored watered silk panel and the glazed paper is uglier than one would believe any Frenchman could invent, were it not so common.

The leather hinge, which makes a continuous border around the four sides of the cover, is rather pleasant for a sumptuous book, and, filled with paper like the opposite fly, has not the objectionableness of the stuff fabrics. The leather for the hinge must be pared to the same thinness as the rest of the turn-in, except for the part which covers the hinge itself. That should be somewhat thinner or the book will close badly. The strip should properly be sewn in with the book itself, but that degree of thoroughness which is difficult and intricate, is omitted by some, and the strip simply pasted in after the book is covered. In this case a thinly feathered edge laps down slightly over the end paper, and the decorative end paper if there is to be one, is cut to the exact size of the other end papers, fitted and pasted over it. A leather hinge should indeed not be attempted by an amateur feeling his way. It is far better to do the fundamental processes well. The very last thing to be done is pasting down the end paper which covers the exposed hinge. This is not done until the lettering and all the decorating is finished, for the reason that the ends become soiled in working on the book. The outer end, or fly, which is soiled is torn off unless, as is well, a protective sheet has been slightly attached. That is now removed and the sheet to be pasted down is turned back, folded and creased closely down over the hinge. Then, with the compasses, a slight dent is made in several places in each side, at equal distances from the edge, just within the width of the turn-in. The sheet is folded back upon the book itself, a sheet of zinc inserted and the "paste-down" leaf trimmed to the points marked with knife and straight edge. Paste is now applied, taking pains that the hinge is thoroly pasted and the paper rubbed down with hands and folder under a clean piece of waste paper to prevent its becoming grubby. It is quite possible to get the book into a very messy state—almost to spoil the looks of it, even in this last process. If the paper does not stick fast over the hinge when the book is closed (as it must not be until thoroly dry) it comes loose there and forms what the men at the Doves Bindery used to call a "pencil case." Pencil cases cause almost as great disgust and depression as any mishap that can befall. They are especially wearying because one is anticipating

the triumphant close of the whole work. They may usually be averted by applying a not too hot polishing iron over a piece of clean waste paper, ironing gently, after the paper has been well pressed down. If one does develop, it is necessary to wet the paper again with a clean sponge or bit of cotton and perfectly clean water, and then apply the hot polishing iron under a piece of clean waste paper, taking great pains not to slide the piece of waste along for fear of tearing the moist "paste-down" under it. When the fly dry the cover is closed and the book is struck rather firmly with a smooth hammer along the hinges. It is then put between plates *under light pressure*, the press being closed down with the hands only. On no account is the lever

to be used. If heavy pressure is applied the leather is torn away from the back and longitudinal wrinkles appear. Probably the gold is also cracked off. In fact, if the pressure has been heavy enough the book is a wreck. This final process of pasting down the ends, when neatly and successfully done, tho one of the minor processes, makes a very great difference in the appearance of the book, removing the naked appearance of the book's bones, as it were, showing along the hinges, and the soiled and untidy look of the protective sheets. It is like the completion of a toilette and the precious volume which, wrought with affection and interest has come to have a distinct personality to the binder, is now ready to meet the not too discerning public.



LARGE BOOKS SEWN ON DOUBLE BANDS.

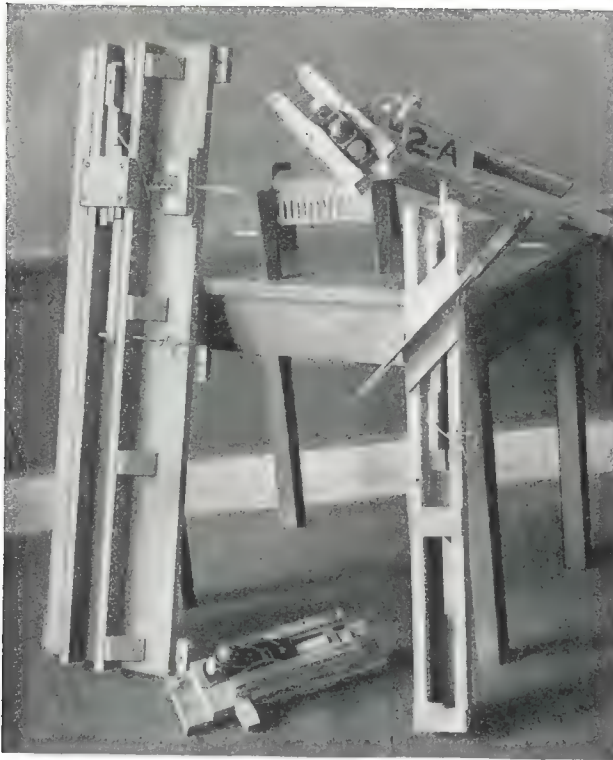


Fig. 18. Set of jigs used in making chairs, foot stools and sewing tables shown in Fig. 19.

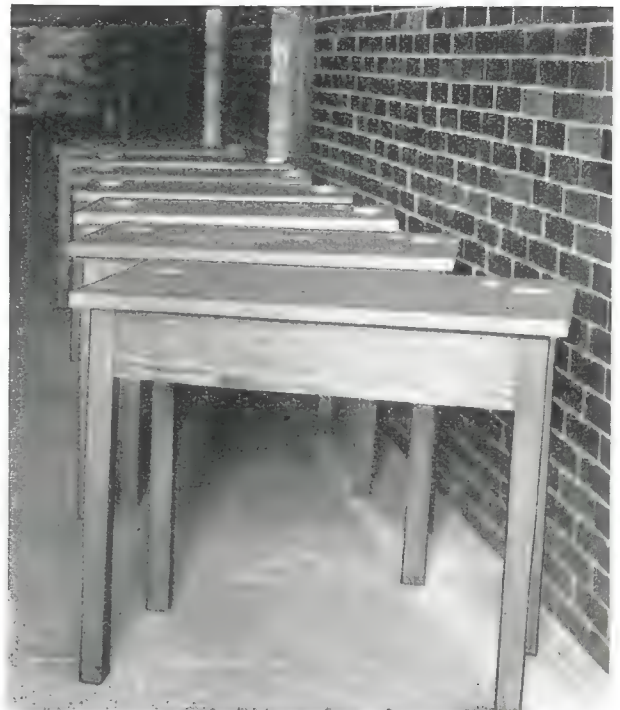


Fig. 20. Set of tables for use as desks in special classes.

SCHOOL SHOPWORK IN MONTCLAIR, N. J.

Fred P. Reagle, Supervisor of Manual Training

(Second Article)

III.

PROBABLY one of the strongest criticisms the manual training man has been subjected to, as a result of the introduction of the vocational movement into education, has been that his work has failed to fill the bill as vocational training because it employs the individual craft methods of work. Most recommendations for vocational training insist that typical shop methods be used. This kind of work in manual training shops has been the rare exception.

The call to make something for the school is not a new one to most teachers of shopwork and possibly the following has been the typical result. If the job is large

enough to employ the entire class it is hurried thru to please the person asking it, and the results, more often than otherwise, are flimsy and fragile. If it is smaller and requires only a few boys, the best are chosen, often to the disappointment of those few. In the case of many such pieces of work, the teacher makes it easier for all concerned by doing them himself. In spite of the foregoing, our shops are looking for jobs to be done by classes for school buildings and individuals other than the makers and all are happy in the doing.

This has been brought about by the introduction of the gang or factory method of work and the use of jigs (Figs. 18 and 21). A jig is a mechanical device used in all highly specialized industries to turn out dupli-



Fig. 19. Furniture for sale—made in dozen lots by the boys shown in picture.

cate parts in the quickest and easiest manner possible. It is the device which has enabled our large plants to produce great numbers of the same object in such a way that any detail from one will fit into its proper place in any other. The automobile gas engine is a good illustration of this type of product. It is rather strange that the jig idea is not employed oftener than it is in manual training work as thereby many of the now laboriously performed operations would be much simplified and the tool practice would be brought more into line with modern methods.

The jigs employed in this type of work in Montclair were made either by the teacher sometime before the class undertook the work or by the class itself after the job had been threshed over in discussion. It seems wise to jig every operation so that, in so far as possible, the individual type of work be eliminated.

The organization of a class for a job of this kind offers numerous and interesting lessons both to the instructor, who acts as superintendent of the whole, and to the class. Our best organization has been that in

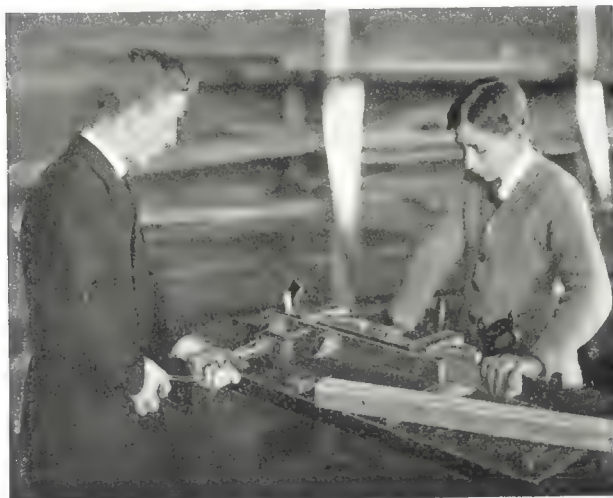


Fig. 21. Boys using jig to bore holes in legs of table. Dowell joint used.

which the job has been discussed by the entire class and analyzed as to the number of operations. In the case of a set of tables (Fig. 20), like which two hundred and twenty have been made in the last two years, the following analysis has held:

- I. Work on Details—(a) Legs, Fig. 21.
(b) Rails.
(c) Braces, Fig. 22.
(d) Dowels.
(e) Top.
(f) Bottom.

II. Assembling, Fig. 23.

III. Finishing.

This analysis, decided on by the class, determines the number of gangs that are necessary and the size of each gang. The foremen, designated by the popular choice of the class have singularly proved to be the best men for their places. Repeatedly we have had the entire work, according to the analysis given, going on at



Fig. 22. Mitre box used to jig corner braces for inside of table. Note finished braces in foreground.

once on the shop floor and this has enabled the boys to see the whole process from the raw material to the finished table.

Some of the gang work carried out successfully during the last two years is:

(a) For the workers or for sale by them, Fig. 19.

Foot stools

Sewing tables

Chairs

Foot rest

Tea wagon

In lots of one dozen.

(b) For schools

TablesNo. made, 220

Work benchesNo. made, 50, Fig. 24

Sand tablesNo. made, 50

Table drawersNo. made, 20

VentilatorsNo. made, 40

BookcasesNo. made, 100, Fig. 25

Primary lockers ...No. made, 10, Fig. 26

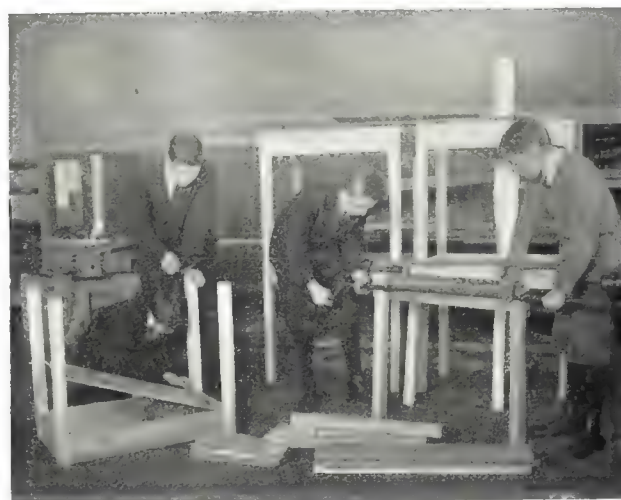


Fig. 23. Gang assembling a set of tables. This gang requires a competent foreman.



Fig. 24. Set of work benches made by one-eighth grade class in five months.

This kind of work is of advantage because:

- (a) It offers a wholesome change from the craft or individual methods of work in Groups I and II.
- (b) It gives a boy an insight into the methods in use in large plants. If manual training is to be an informational subject it should be informational in the way the work of the world is done today and not as it was a thousand years ago
- (c) It enables the shopman to turn out needed projects for shops and school buildings and to keep everyone happy while doing it.

IV.

In the problems made in groups I, II and III, the worker is brought in contact almost entirely with that type of lumber known in the trade as "randoms." It is the lumber used in the furniture trade for cabinet work or by the mill man for window and door frames and house trim. As a contact with this kind of material and no other is likely to tend towards a one-sided training, this fourth group of work is added to enable boys to have a little experience in handling stock lumber and materials such as can be procured at any lumber yard dealing in building materials, and such as is used by carpenters in house building and other typical building construction.

This is brought about by building for the Board of Education, or for sale, at the prices of material used, a small building such as a garage (Fig. 27), chicken coop, dog house, or tool house for school garden. It should be so arranged that every boy, once at least in his elementary school experience, might have an active part in constructing a building of this kind. The buildings enumerated in the above list have been carried thru successfully.

B.

The apportionment of these four groups of work or the statement of a course of study now becomes an easy task. It is a prescription giving doses of Group I, II, III, and IV to the grades concerned in specific amounts. A schedule of courses along the lines mentioned would be about as follows:

Grade V.

Toys.

The study should be concerned with the subject matter given in group II. The first part of the year until Christmas should be devoted to the making of toys for presents. The problems of the remainder of the year could, with advantage, be grouped around the study of transportation—from the primitive methods employed by the Indians down to the simple freight or flat car.

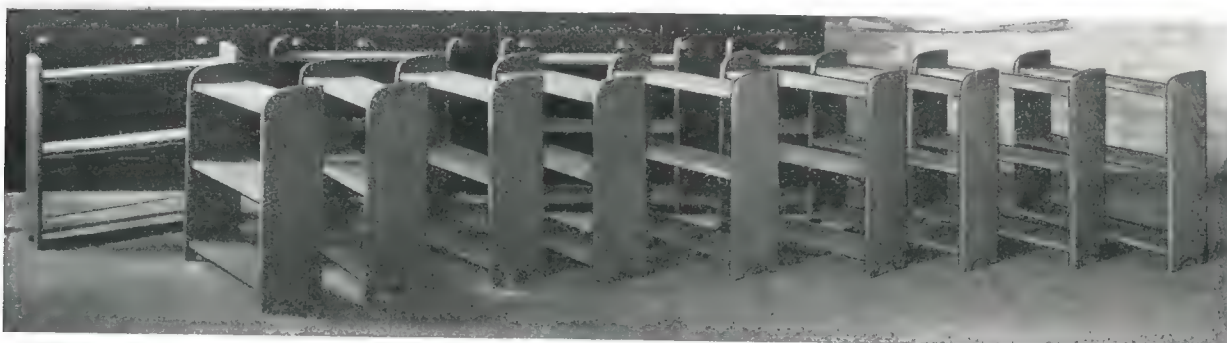


Fig. 25. Set of small bookcases for classrooms to accommodate collections of books loaned to rooms by Public Library. Grade VII. I

The list includes in addition to those given, wheelbarrows, wagons of different kinds, sleds, boats and automobiles. The culmination of the year's work could be a sand table study of "Lumber from the Forest to the Mill" or "Iron Ore from the Mine to the Smelter," using the problems already made in its assembling.

It seems logical in a school system, in which the constructive work of the first four grades has dealt with paper, cardboard, reed, raffia and clay, to begin work in wood in the fifth grade according to the scheme outlined because:

- (a) The play instinct in the child is still strong.
- (b) It can be carried out with a few tools and materials: coping saw, hammer, nails, glue, sandpaper and color.
- (c) Pedagogically it is correct because we are approaching the subject psychologically or the way the mind of a child would approach work in wood.

Grade VI.

- (a) Craft work—one-half year—Group I.
- (b) Correlation work—one-half year—Group II.
 1. Water wheels or
 2. Time and its measurement.

Grade VII.

- (a) Craft work—one-third year—Group I.
- (b) Correction work—one-third year—Group II.
 1. Cement, or
 2. Air, or
 3. Printing.
- (c) Gang work—one-third year—Group III.

Grade VIII.

- (a) Craft work—one-third year—Group I.
- (b) Correction work—one-third year—Group II.
 1. Steam, or
 2. Electricity.



Fig. 27. Garage twelve feet by sixteen feet being constructed by eighth-grade groups for board of education. The building was made knock down and almost entirely completed inside of shop.

- (c) Gang work—one-third year—Group III.

The apportionment of time in the various grades to subject matter in groups I, II, and III is only approximate and would vary, depending on conditions.

The work discussed in A, group IV, should be inserted preferably in Grade VII or VIII.

In conclusion, it might be well to state that the entire scheme of work as given in this discussion, is not a dream or an ideal, but one that is being carried out yearly in shop classes of 24 boys, and with a time allowance of ninety minutes per week.

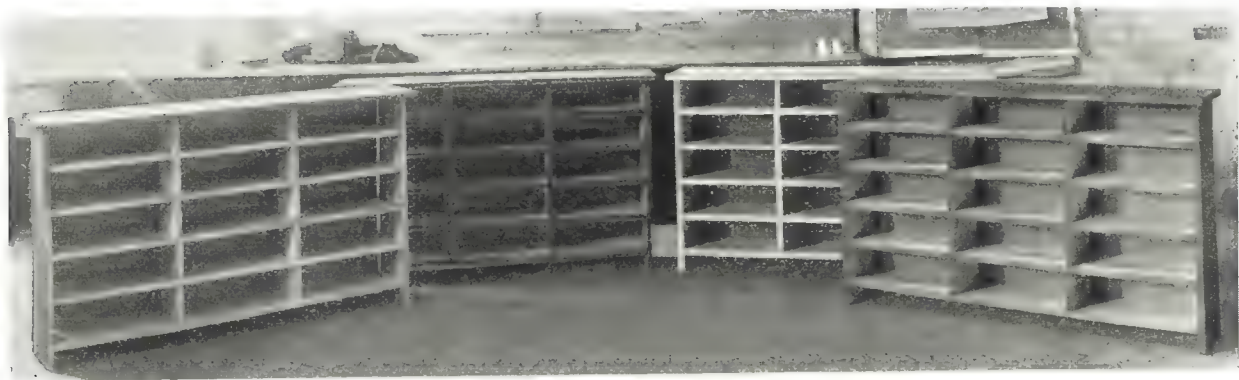


Fig. 26. Lockers for Primary Grades. Used to store books, etc., of classes having movable furniture, viz.: Tables and Chairs.

DOMESTIC ART IN THE GRADES

Ada Gause, Pratt Institute, Brooklyn

(Fourth Article)



PROBLEMS in Figure 8, if given to Seventh-Grade children who have followed a Domestic Art course similar to the one given in these pages, should be elaborated upon and made of very dainty sheer materials. The finished articles will then stand as graduation pieces in fine handwork.

For children in the Seventh, Eighth or Ninth grade who have never had Domestic Art work, or if their work has been of a low standard, the problems as shown in Fig. 8 and 8a would be advisable.

VII. Running Stitch.

Note—Lessons developed same as Beginner's Problem.

Lesson II.

- I. Review of Lesson I.
- II. Talk on:
 1. Construction of cloth (Illustrate on Board).
 2. Construction of Cap.
- III. Placing patterns—Ref. Lesson III. Cooking Apron.
- IV. Cut all parts of Cap (two pieces for band).

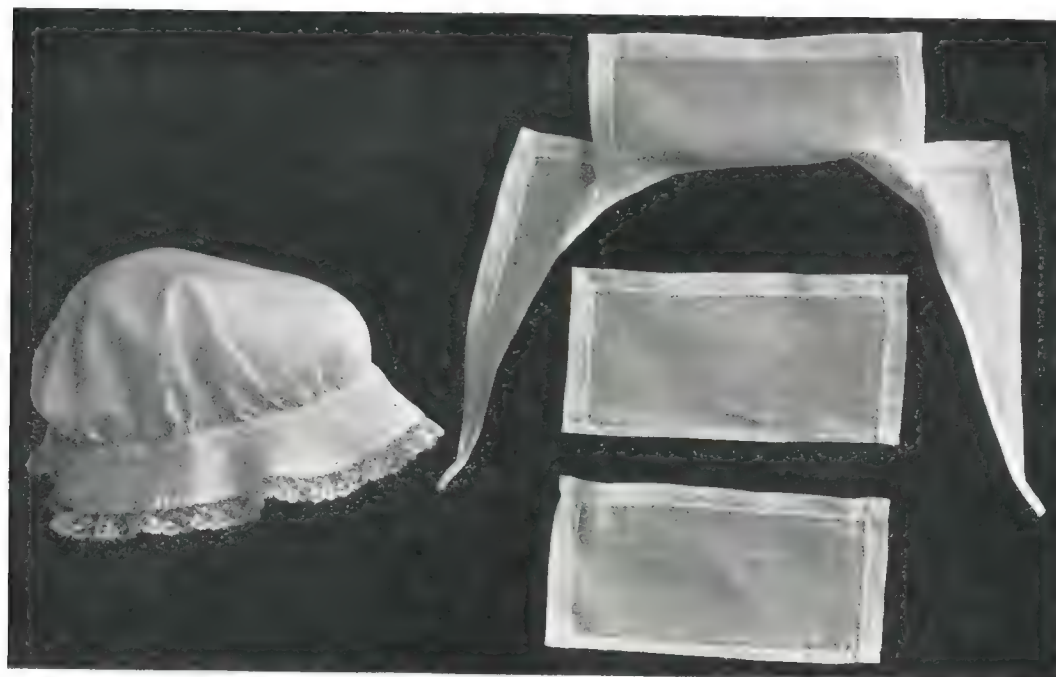


Fig. 8. MORNING CAP AND COLLAR AND CUFF SET.

Presented in detail as follows:

Morning Cap.

Lesson I.

Periods $11\frac{1}{2}$ hours.

I. Introduction:

1. Exhibit finished cap which will represent a high standard of work.
2. Talk on:
 - Choice of material.
 - Style and usefulness of cap.

II. Necessary Implements:

1. Sewing Apron.
2. Thimble.
3. Tape Measure.
4. Needles.
5. Thread.

III. Threading Needles.

IV. Tying Knot.

V. Uneven Basting.

VI. Even Basting.

Lesson III.

- I. Review Lesson II.
- II. Combination Stitch (Illustrate on board).
- III. Making Cap Band.

Construction of Cap Band: Fig. 9b.

1. Place center fronts together and pin, material placed flat on table.
2. Place pins each way from center front toward back, keeping material flat on table. Give reasons. (Otherwise the material will become disarranged.)
3. Baste with uneven basting. (Why?) Ref. Beginners' Problem.
 - a. Along thru center beginning at back, with material flat on table, taking one stitch at a time.
 - b. Baste from right to left keeping point of contact directly in front, and one near edge of table, turning material as you baste.
4. Remove pins.

5. Take materials in hand and place a row of even bastings $\frac{1}{4}$ inch from edge.
6. Remove uneven bastings.
7. Sew with combination stitch on line of even basting.
8. Remove even bastings.
9. Press seam open with fingers.

Lesson IV.

- I. Review.
- II. Textile Study Introduced.
- III. Working period—Lesson III continued.

Note—The study of cotton should be carried along with this problem.

Lesson V.

- I. Stitching stitch.
- II. Joining ends of the band.

Stitching stitch. Ref. Sewing Bag.

1. Demonstrate stitch.
2. Used for sewing seams if strength is required.
3. Strength: strongest of all stitches.

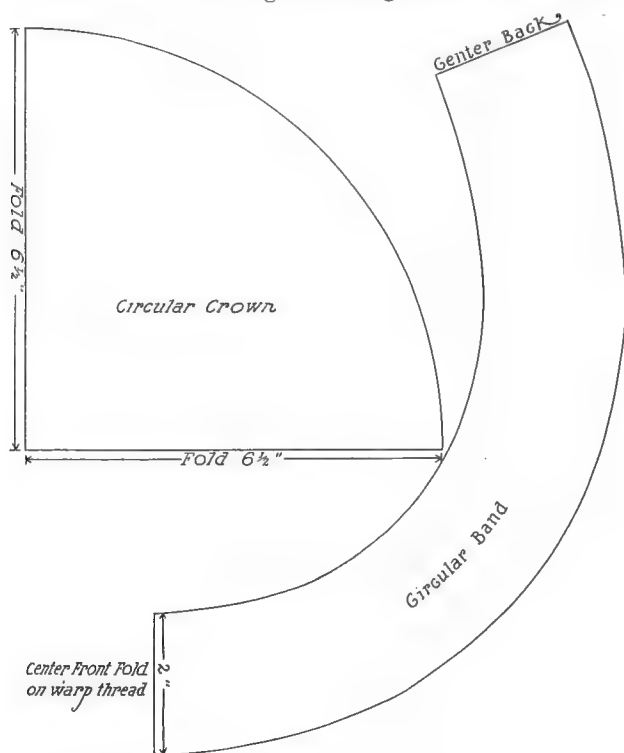


Fig. 9a. Morning Cap Pattern.

Instructions to class; demonstrate.

Joining ends of the band.

1. Match seams.
2. Pin.
3. Baste in $\frac{1}{4}$ inch seam, using even basting.
4. Stitch (by hand).
5. Remove basting.
6. Press seam open with iron.

Turn cap band on line of combination stitches and baste with even basting. (Why?) (Exceptional use of even bastings.)



Fig. 8a. Sewing Apron.

Place a line of uneven bastings $1\frac{1}{4}$ inches from headline, to keep material in place until crown is placed.

Lesson VI.

Things learned so far in making cap:

- I. Stitches.
 1. Basting.
 - a. Even.
 - b. Uneven.
 2. Combination stitch.
 3. Stitching stitch.
- II. The Problems applied to:
 1. Making a sailor collar—
 - a. With lining.
 - b. Without lining, fitted facing on edge.
 2. Making sleeve finishes at hand.
 - a. Turn back cuffs.
 - b. Cuff bands.
 3. To face an outgrown skirt—
 - a. Rip hem out.
 - b. Press.
 - c. Cut facing to fit if bottom is circular.
 - d. Warp threads up and down if skirt is straight.
 - e. Place facing and skirt right sides together, seam in back, and pin.

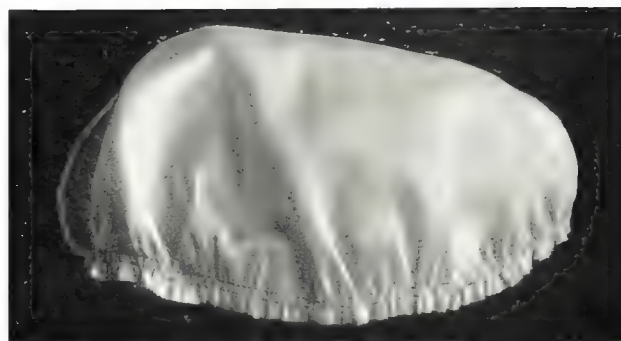


Fig. 9b. Construction of Morning Cap.

- f. Baste with even bastings, $\frac{1}{4}$ inch from edge.
- g. Stitch with combination stitch.
- h. Remove bastings.
- i. Press seam open.
- j. Turn on seam line.
- k. Place even bastings near turned edge, same as in cap band.
- l. Turn under upper edge, baste with even basting.

Lesson VII.

- I. Review application of principles learned in making cap band.
- II. Quarter headline on band.

8. Place gathers $\frac{1}{8}$ inch from edge.

9. Place second gathering thread $\frac{1}{8}$ inch below first line of gatherings. Stroke each needleful. Ref. Lesson IX in Apron outline.

Lesson VIII.

Steps in placing crown:

1. Place together center front of crown and center front of band, right sides together. Warp thread from front to back.

Note—Review test for warp and woof. Ref. Apron introduction.

2. Pin in place, edges coinciding.
3. Place center backs in same way, then match quarter marks.

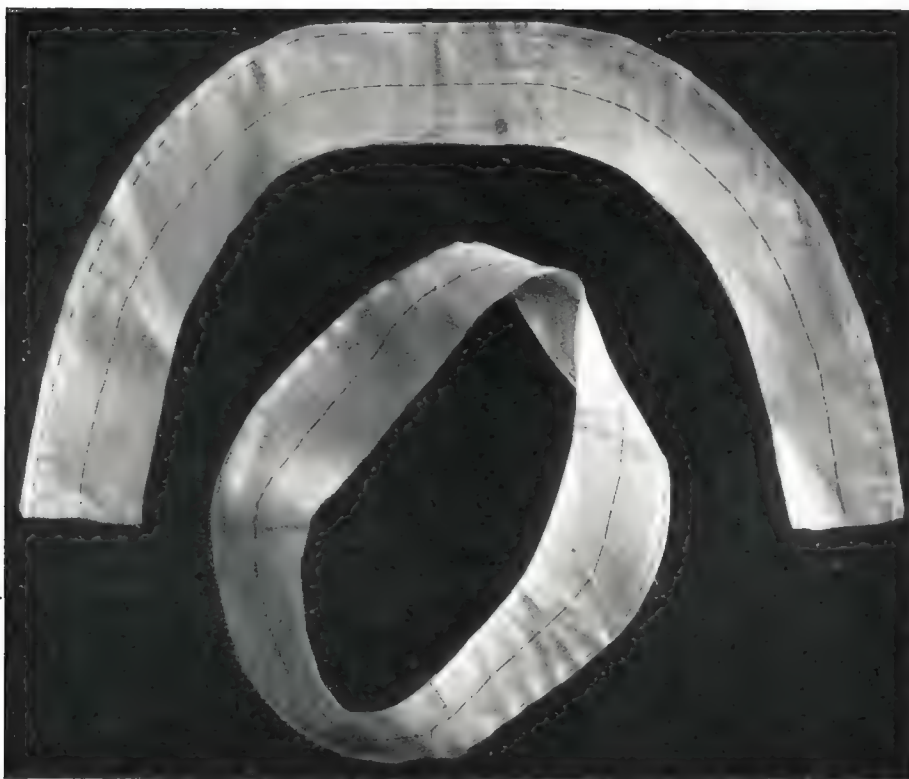


Fig. 9c. CONSTRUCTION OF MORNING CAP.

- III. Quarter circumference of crown.

- IV. Placing gathering threads.

(For the above see Fig. 9b.)

Development of Lesson:

1. Fold headline of cap band in quarters.
2. Mark each quarter with pins.
3. Replace pins with running stitches.
4. Begin $\frac{1}{2}$ inch below edge (begin with knot, use red thread). Sew to edge, cut thread without fastening.
5. These marks should remain until cap is finished. (Knot being below edge makes it easily found when thread is to be removed.)
6. Fold circumference of crown in quarters, and mark each quarter the same as headline.
7. Place a continuous gathering thread around circumference. Begin in center back and take back-stitch in center front.

4. Draw gathering threads to fit each quarter and fasten thread around pins at center back, being careful to draw both gathering threads to same length.

5. Arrange gathers in each quarter, fullness equally distributed.

6. Place pins about every inch, heads up, pins must always be placed parallel with gathers (placing them across gathers). Disarrange gathers.

7. Baste with even bastings on line of lower gathering thread.

8. Hold gathers toward you while basting.

Lesson IX.

- I. Review stitching stitch.
- Continue work.

Instructions to class:

1. Place a line of stitching stitches on line of even bastings around headline.

2. Remove all bastings and gathering threads around headline, except the quarter marks.
3. Turn $\frac{1}{4}$ inch under on facing to inside.
4. Place turned-in edge of facing to stitching around headline. Pin in place.
5. Replace pins with even basting.

Lesson X.

I. Vertical hemming stitch.

Demonstrate. Ref. Paint Bag construction.

II. Class practice, use red thread and white material.

III. Place hemming stitch on facing.

Lesson XI.

I. Whipping on lace.

II. Making lace join.

Presentation of lesson:

1. Demonstrate whipping on lace, holding lace edge parallel with edge of cap. (2) Demonstrate lace, join by overlapping ends, design matching. Use button-hole stitch.

Instructions to class:

1. Practice whipping on lace.
2. Practice lace joining.

Lesson XII.

I. Finish Cap.

1. Whip lace on edge.
2. Press.
3. Review, make application of principles learned in cap lessons.
4. Each cap should be neatly tagged by pupil and kept by the teacher to be graded.

Note—Finished work should always be on exhibit in the sewing room.

The following outline of the Sewing Apron shown in Fig. 8a indicates: (1) The number of $1\frac{1}{2}$ hour lessons. (2) Amount of work to be done each lesson. (3) Steps in construction.

Lesson XIII.

Note—Show finished apron to class.

1. Aprons cut by children, draw threads cut 24x24 inches.
2. Demonstrate rolling a hem and whipping on lace.
3. Class practice.

Lesson XIV.

1. Review construction of cloth and placing of warp threads. Ref. Apron outline introduction.
2. Roll hem and whip lace on bottom of apron.

Lesson XV.

1. Turn up bottom 5 inches for pocket and baste.
2. Turn $\frac{1}{4}$ inch hems on side of apron and baste.
3. Place vertical hemming stitch on edge of hems.

Lesson XVI.

1. Overhanding stitch.
 2. Turn $1\frac{1}{2}$ inch hem across top of apron.
- Demonstrate overhanding stitch, give application.

Directions:

1. Place overhanding stitch on ends of side hems.
2. Place vertical hemming stitch on hem at top and overhand $\frac{1}{4}$ inch at ends of top hem.
3. Draw $1\frac{1}{4}$ inches wide ribbon thru top hem.

PROBLEMS IN FARM MECHANICS

Louis M. Roehl, Milwaukee County School of Agriculture

(Fourth Article)

Three Horse Evener.

Lumber: 1 piece select hickory $1\frac{3}{4}" \times 5" \times 4'-4"$. (If hickory is not available, white ash may be used.)

Hardware: 1 iron rivet $\frac{1}{4}" \times 3\frac{3}{4}"$ with 2 washers.
1 iron rivet $\frac{1}{4}" \times 5\frac{1}{4}"$ with 2 washers.

Directions

1. Reduce stock to $1\frac{3}{4}" \times 5" \times 4'-4"$.
2. Lay out the taper for the one-horse end by drawing a line from a point on the back edge of the stock 21" from the two-horse end to a point on the one-horse end $3\frac{1}{2}"$ from the front edge.
3. Remove the stock to line with saw and plane.
4. Lay out and cut a $\frac{1}{4}"$ chamfer on the edges of the stock as indicated in the drawing.
5. Bore $\frac{1}{4}"$ holes for the rivets $1\frac{1}{4}"$ from ends and fasten rivets by securely riveting them.
6. Locate points 2" from ends and $1\frac{1}{8}"$ from back edge of stock and bore $\frac{5}{8}"$ holes for clevises.
7. Locate a point 18" from the two-horse end and $1\frac{1}{8}"$ from the front edge, and bore a $\frac{3}{4}"$ hole for main clevis pin.

Two Horse Evener.

Lumber: 1 piece select hickory $1\frac{3}{4}" \times 4\frac{1}{2}" \times 4'-0"$.
Hardware: 2 iron rivets $\frac{1}{4}" \times 3\frac{3}{4}"$.

Directions.

1. Reduce stock to $1\frac{3}{4}" \times 4\frac{1}{2}" \times 4'-0"$.
2. Lay out the taper by drawing lines across the back edge of the stock 21" from each end and lines across both ends $3\frac{1}{2}"$ from the front edge and connecting the lines by lines drawn on the sides of the stock.

3. Remove the stock to line with the saw and plane.
4. Lay out and cut a $\frac{1}{4}"$ chamfer on the edges of the stock as indicated in the drawing.
5. Bore $\frac{1}{4}"$ holes for the rivets $1\frac{1}{4}"$ from ends and place rivets.
6. Locate points 2" from ends and $1\frac{1}{8}"$ from back edge of stock and bore $\frac{5}{8}"$ holes for clevises.
7. Locate a point 24" from either end and $1\frac{1}{8}"$ from the front edge and bore a $\frac{5}{8}"$ hole for the main clevis pin.

Singletree.

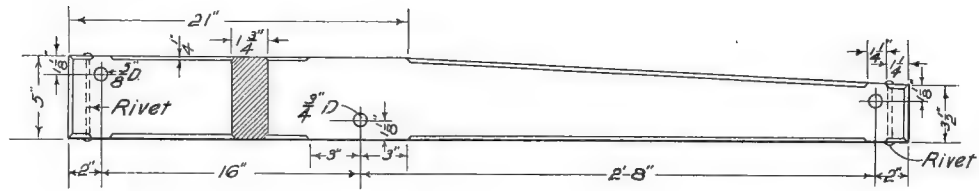
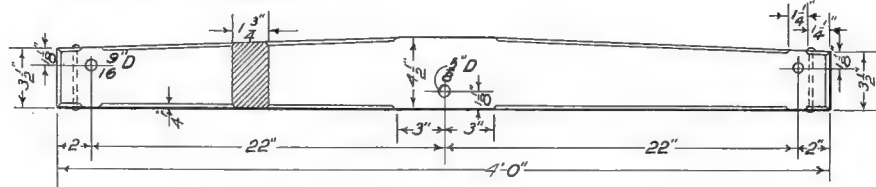
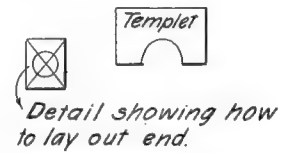
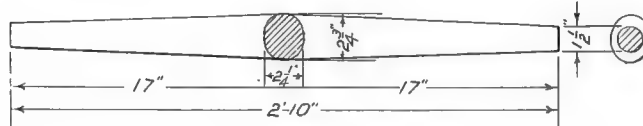
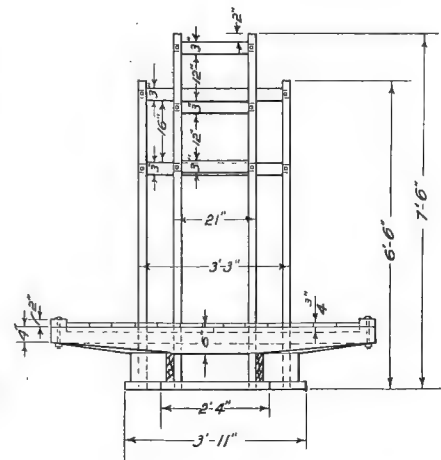
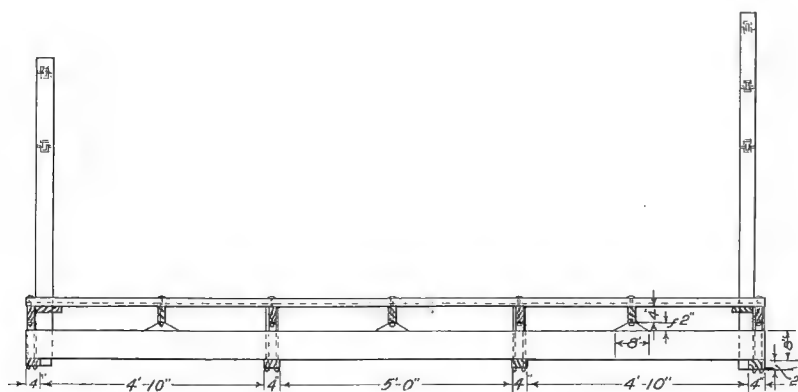
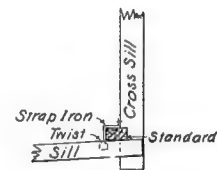
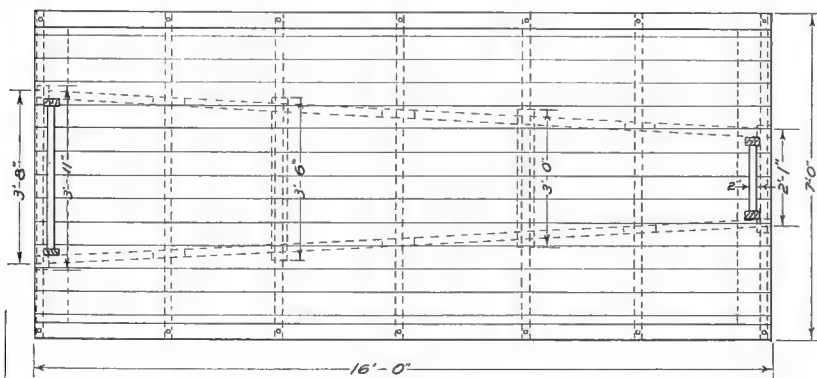
Lumber: 1 piece of hickory $2\frac{1}{4}" \times 2\frac{3}{4}" \times 2'-10"$.

Directions.

1. Square up the stock to finished dimensions.
2. Find the center at each end by drawing lines diagonally as shown in the detail drawing.
3. Draw a circle at center of each end $1\frac{1}{2}"$ in diameter.
4. Cut a templet of pasteboard as shown in the detail drawing and use in getting the singletree a perfect oval at the center.
5. In removing the stock, bring it to a square at the end, then an octagon and then a circle. Remove the bulk of the stock with the saw and finish with the plane. The singletree may be sanded to produce a smooth finish.

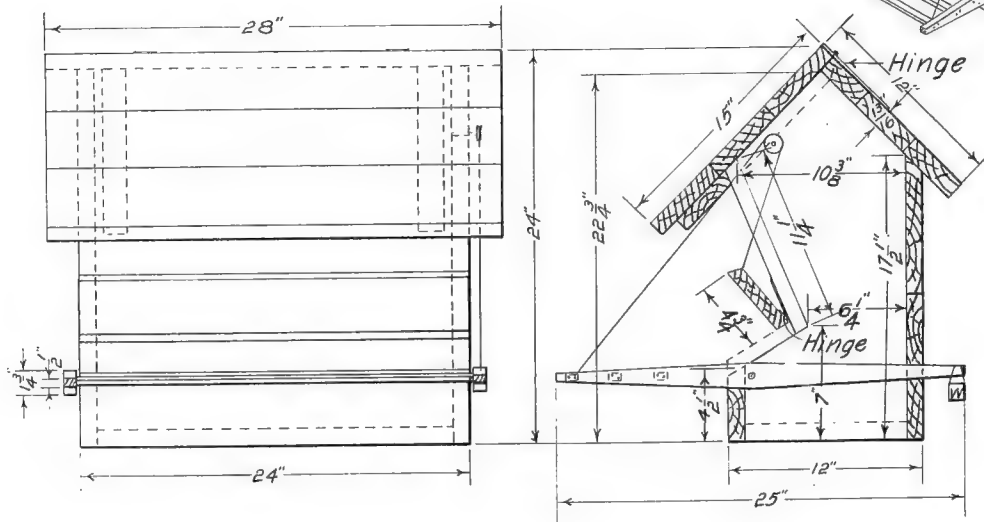
FLAT HAY RACK.**Material Required.**

Lumber: 2 pieces yellow pine $2" \times 8" \times 16'-0"$.
3 pieces yellow pine $2" \times 4" \times 14'-0"$.
3 pieces yellow pine $2" \times 4" \times 12'-0"$.
2 pieces yellow pine $2" \times 4" \times 16'-0"$.
1 piece yellow pine $2" \times 4" \times 8'-0"$.

Three Horse Evener*Two Horse Evener**Singletree**Flat Hay Rack*

DETAILS FOR FLAT HAY RACK.

Chicken Feed Hopper



- 2 pieces yellow pine 2"x6"x14'-0".
 1 piece yellow pine 2"x2"x 3'-0".
 1 piece yellow pine 1"x6"x14'-0".
 13 pieces yellow pine flooring 1 3/8"x6"x16'-0".
Hardware: 8 hayrack clamps 16 1/2" long.
 14 carriage bolts 3/8"x6 1/2".
 1 lb. 10d common nails.
 4 pieces strap iron 1/8"x1"x7".
 1 quart of outside paint.

Stock Bill.

Pieces	Finished Dimensions	Use
2	2"x8"x16'-0"	Sills.
1	2"x4"x 3'-11"	Cross tie.
1	2"x4"x 3'-6"	Cross tie.
1	2"x4"x 3'-0"	Cross tie.
1	2"x4"x 2'-1"	Cross tie.
4	2"x6"x 7'-0"	Arms.
3	2"x4"x 7'-0"	Arms.
6	2"x2"x 0'-6"	Arm rests.
2	2"x4"x 7'-6"	Front standard
2	2"x4"x 6'-6"	Rear standard.
3	2"x4"x 0'-21"	Front standard.
2	2"x4"x 3'-3"	Rear standard.
2	2"x4"x16'-0"	Side supports.
4	1 3/8"x6"x 3'-2"	Platform cleats.
13	3/4"x6"x16'-0"	Floor.

Directions.

1. Reduce all pieces to finished dimensions.
2. Bore holes thru main sills and cross ties for hay rack clamps and fasten the 2"x6" arms in place. If patented clamps are used holes need not be bored thru the sills, as they straddle the sills. Clamps may be made of 3/8" round iron.
3. Nail the clamp rests in place half way between the 2"x6" arms.
4. Place side supports in position at the ends of the cross sills, bore 3/8" holes and place one 3/8" carriage bolt thru each end of each arm.
5. The platform is made in two sections, half of the floor boards being fastened together for one section and half for the other. Fasten the floor boards to the platform

cleats by using two 10d common nails for each end of each board.

6. Mortise the cross members of both front and rear standards to the uprights of the standards, in positions indicated in the drawing, and fasten with dowels or screws.

7. Cut a shoulder at the lower ends of the standards so that the standards will rest on the front and rear cross sills.

8. Fasten a piece of strap iron to the lower edge of the main stringers and the inside edge of the front and rear cross sills as shown in the detail drawing for the lower end of the standard to drop into.

9. Cut openings thru the floor for the standards.

10. Paint the hayrack.

CHICKEN FEED HOPPER.

Material Required.

Lumber: 2 pieces white pine 1"x12"x12'-0".

Hardware: 1/2 lb. 8d common nails.

- 1 round-head blued wood screw 1 1/4" No. 10.
 2 round-head blued wood screws 1 3/4" No. 10.
 1 doz. 6d common nails.
 1 doz. 6d finishing nails.
 2 pair 6" light T hinges.
 32" of heavy cord.
 Small piece of wire for fastening weight.
 2 small screw eyes for fastening cord.

Stock Bill.

Pieces	Finished Dimensions	Use
1	1 3/8"x10 3/8"x22 3/8"	Bottom.
2	1 3/8"x10 3/8"x22 3/4"	Ends.
2	1 3/8"x 8 3/4"x24"	Back.
1	1 3/8"x 4 1/2"x24"	Front at bottom.
1	1 3/8"x11 3/4"x24"	Front.
1	1 3/8"x 4 3/4"x24"	Door.
1	1 3/8"x11 3/8"x2'-4"	Top.
1	1 3/8"x 7" x2'-4"	Top door.
1	1 3/8"x 8" x2'-4"	Top door.
2	1 3/8"x 2" x13"	Cleats for door.
2	1 3/8"x 1 3/4"x2'-1"	Levers.
3	1/2"x 1 3/8"x24 1/4"	Perches.
1	1/2"x2" D. Circle	Pulley.

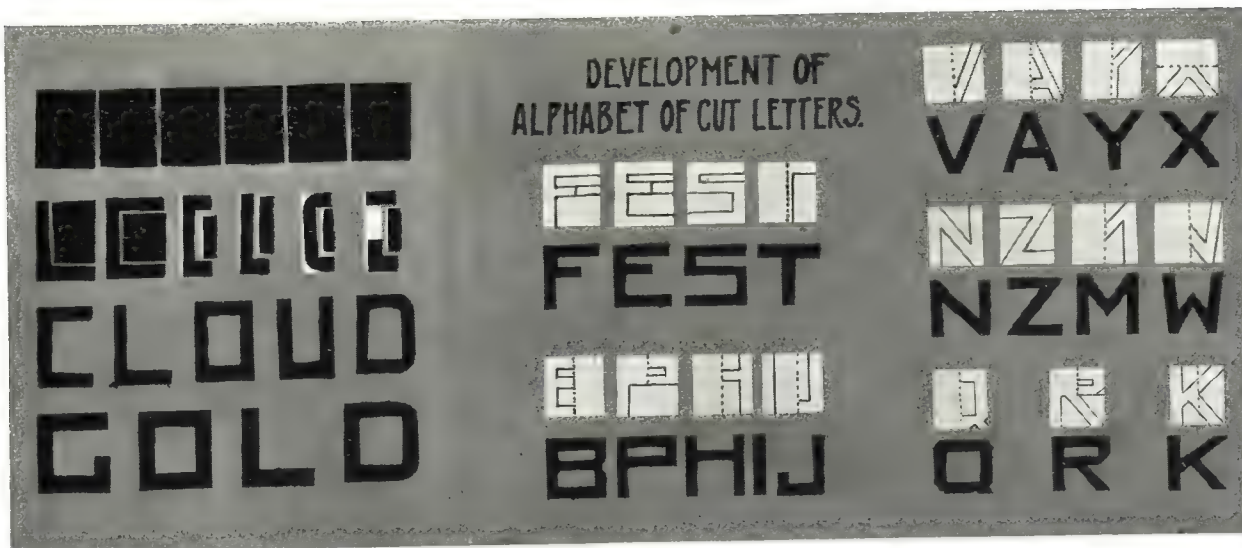


PLATE 1. GRADE I. LETTER CUTTING.

Teaching Advertising Thru Paper Cutting

Mary G. McMunigle, Supervisor of Art, Pittsburgh, Pa.

(Second Article)



ADVERTISING! There is magic in the word for children. Their interest springs into life at once and they feel a true professional pride in their results.

To teach the principles of advertising, paper cutting is more admirably adapted than any other medium because flat, decorative shapes carry better, and tell the story more clearly and quickly than those showing much detail. Paper shapes solve the problem and help children to appreciate this important principle of modern advertising.

Good legible lettering is the foundation on which advertising is builded and Grade 1 is the place to begin it. Legibility depends on uniformity in size and spacing and this may be readily achieved by the youngest children if the steps in Plate 1 are followed. The letters are grouped in the order of their difficulty. A very slight variation of the cuts in the L and C produce the entire alphabet. The child by varying the width of his strip and the number of folds to divide the strip into letter blocks, is enabled to fit his letters to any space. All cuts being on the *inside* of blocks keeps letters uniform in size.

In Grade Two the relation of the shapes formed by the printed word, to the background space, should be considered. The shapes must be consistent and in good proportion, emphasizing the principle of composition. The cover for a valentine, Plate 2, offers one of the many opportunities of daily interests and tests ability to make a short word fill the same space as a long one.

In Grade Three we learn that the decoration for an advertisement must bear a very close relationship to the context of the lettering. A border of leaves would not consistently decorate the booklet cover of Plate 3 advertising fruit. In the page arrangement, Plate 3a, lining

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up the lettering and the illustration is the new step to be learned. The proportion of the illustration to the lettering and to the whole page should emphasize the same step in composition which the class is considering.

In Grade Four where the class is just beginning to study the laws of background spacing, the principles of letter spacing and emphasis in advertising may be experimented with thru the problem shown in Plate 4. Simplicity of the statement—emphasis of the important word by size and placing in the space. Lack of ornamentation which would weaken it. Proportion of spaces between words to the words and to the whole space. All this may be worked out by moving the paper strips and margin about before cutting the strips into the letters.

In Grade Five it is well to consider the principle of balance or the attractive power of color and shape in advertising. Experiment with an unbalanced arrangement gives a result so obviously unsatisfactory that children realize the actual "pull" that an object may have on the eye in causing it to rest on a certain spot. It is well to keep to bisymmetric arrangements in this grade.

In Plate 5 instead of adding the margins, the paper forming the enclosed space is to be divided and moved about on the card until pleasing margins are obtained. To get rid of such unpleasant letter spacing, as in C, T, O, in the word DOCTOR, Plate 4, the pupils should aim for better design and more artistic lettering in Plate 5 by planning the letters in more careful relation to one another to form a pleasing design.

In Grade Six quite a little fun may be had while humorous designs for frosted animal cookies, are being worked out. In this problem, Plate 6, we must realize the necessity of considering the lettering as part of the whole design. The knowledge of using and balancing

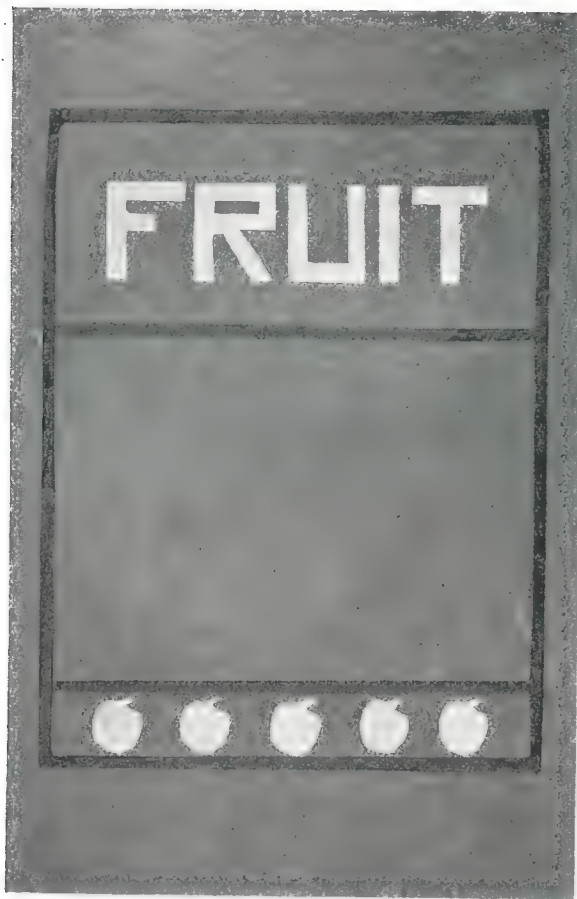


Plate 3. Grade III. Cover arrangement for fruit booklet.

the spots of intense color in the red tongue and the word ZOO, which is also intense red, is tested.



Plate 2. Grade II. Cover for valentine folder. Lettering and cover consistent in shape.

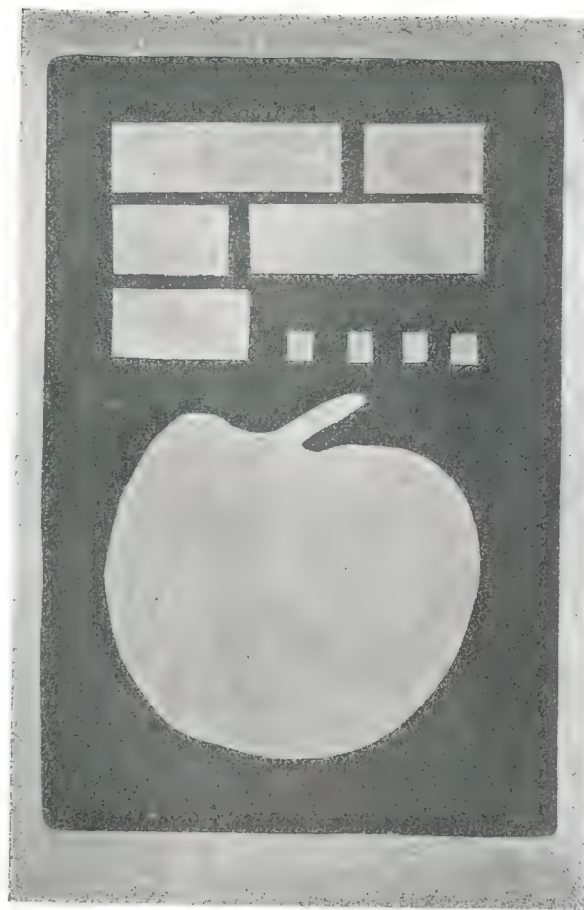


Plate 3a. Grade III. Page arrangement for fruit booklet.

The proper arrangement of an advertising layout for a pamphlet or magazine page may be taken up in Grade Seven. We must consider the consistency and proportion of decoration to title; the proportion and relative importance of heading and body of text; the proportion of the whole layout to the sheet. In Plate 7, a sheet of black paper the size of the layout is placed on a white sheet the size of the pamphlet. A smaller white sheet placed on this allows the black margin to show all around. The white is then divided into three parts in good proportion for heading, body, and foot. Then the heading is cut into three parts in good proportion for decoration and title. The parts may be experi-



Plate 4. Grade IV. Emphasis and Spacing.



Plate 5. Grade V. Post Card. Bisymmetric Balance and Letter Spacing

mented with upon the black paper until a satisfactory width of enclosing line is obtained. Then parts are pasted.

In the fruit decoration the leaf shape is subordinated to emphasize the perfection of the fruit shown by its largeness and color, which is intense green. The movement of line in the decoration should lead toward the title. This problem brings into actual use all the principles of composition the class is studying at this time.

In Grade Eight the problem of a large poster or window card, as in Plate 8, may be used to review all the principles taught thru the grades with the added

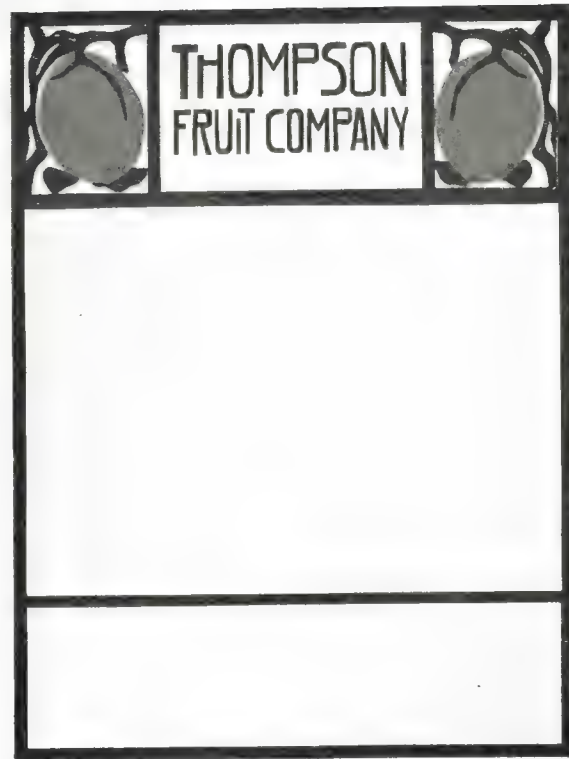


Plate 7. Grade VII. Arrangement for a Pamphlet Page. Proportion of Head, Body and Foot of Layout



Plate 6. Grade VI. Animal Cracker Balancing One Intense Color.



Plate 8. Grade VIII. Window Card. Occult Balance.

problem of Occult Balance. Margins must be correct; lettering must be legible, well proportioned and spaced; consistent in size and shape with the object advertised, while the most important words are given emphasis by size; the advertisement must be balanced in mass, color and interest; the idea must be given briefly and clearly; all movement must be toward the important thought or

center of interest; angular lines that lead out of the composition should be avoided; silent spaces emphasize the thought and allow it to be read more easily.

In every problem the great advantage in cut paper is the opportunity it allows for quick experimental arrangements, which is vital and not permitted by any other medium.

Blistering, Cracking, Scaling and Non-Drying of Paint

WHOSE FAULT?

John W. Luthe, Cleveland, Ohio



SHALL talk to you this evening about blistering, cracking, scaling and non-drying of paint. My discussion will have to do mostly with the responsibility of the painter in such cases, just how he may safeguard himself and at the same time do justice to his employer.

I take it for granted that every painter has had more or less trouble with jobs blistering and at times scaling, and that usually he pleads guilty whether he is at fault or not. This is because he does not look into the painting question deeply enough. "Paintology" is a study by itself. We painters have many things to contend with and are compelled to do many things for our customers which are at times very unreasonable and a detriment to the job. Many of you have repainted jobs that were either cracking, blistering or on which the paint surface in places was not entirely hard. In your western towns, from what I have seen, cracking and scaling seem to be the most common. This trouble has always been blamed on the painter doing the last job, regardless of the material used, the condition of the old paint, the color selected by the owner, or the time of year when work was being done, all of which are of great importance. In taking a job, the painter usually says, "Yes, Mr. Smith, I will paint your house two coats for two hundred dollars." He figures it at so much per yard, seldom taking into consideration the condition of the paint, or the elaborate work in trimming, etc., and the increased labor cost which such things may cause.

The Condition of the Old Paint is Important.

For example, we will take a house where the paint is in bad condition. If the paint last used on the building was not acquainted with lead and linseed oil, or even if it contained good lead and colors, but old fat linseed oil or any dope oil, no matter by whom the building is now painted nor how good lead, color or linseed oil is used, *the job will go wrong unless all old paint is removed*. Linseed oil, as well as turpentine, will become rancid and fat by being exposed to the air any length of time. This applies also to any paints left standing around in your shop or buildings. *On no account should*

old paint which has become fat be used for priming either old or new work. The old oil which is in that fat condition can be used on a fence, brick work or for tin work. I find nothing better for such purposes than this oil and lamp black.

On a house the siding overlaps, the bottom of each board projecting out over the top of the one below it. The upper half of the siding does not get the exposure to the weather which the lower half does. This is true also of such parts as under porches, cornices and on shady sides. The lower part of the siding, on account of greater exposure to the elements, will dry quicker and harder than the upper part. The first coat on an old job usually dries, but the upper part of the last coat never dries so hard. I have found that some painters put on one coat one day and follow with the second a day or two after, instead of allowing plenty of time for the paint to dry between coats. Such practice is commercial suicide to the master painter. The reason for rushing this work this way is to save taking the ladders away and having to bring them back again.

Look Out for Blisters.

Jobs that are finished as I have described have caused as much, or more, trouble than if poor material had been used. With a house which has been painted in a rush, as I have described, or which is in a tacky condition, even tho it be painted with two coats of good lead and linseed oil with about 10 to 20 per cent of coloring matter, and the proper amount of turps in the first coat (one quart of turps to five gallons of oil for first coat and finishing coat with clear lead and oil and no turps), and even tho there be allowed about six to ten days between coats, your last coat will become perfectly dry, air-tight so to speak, forming a hard, glossy, smooth surface and the job looks good. However, let the sun come on to it rather hot and you will find that the sun is boiling the soft old undercoat of paint, forming gas bubbles which blister out because the gas cannot escape. Your last painting has been a perfect job and yet you have a job of blisters on the house. On the other hand, had you used lead and oil mixed with about 20 per cent or more of zinc, or with some kind of mixed paints, your job would have alligatored or probably scaled, depending somewhat on the original priming. The old under surface being soft, the last coat of paint drying from above causes the old tacky paint to dry also, and the natural shrinkage causes the

NOTE.—The present article is a lecture delivered during the Second Annual Painters' Short Course, offered by the Department of Engineering Extension of the Iowa State College, Ames, Ia.

Mr. Luthe is a master painter of national reputation and has been an instructor in the trade short courses of the Engineering Extension Department for the past two years. He held a six weeks' course at Waterloo during January and February, 1916.

The article is reproduced here thru the courtesy of Prof. Kenneth G. Smith, Director of the Department.

new paint to contract, resulting either in pulling all paint away from the surface, cracking, or alligating.

When zinc or mixed paint is used, particularly in under or priming coats, cracking and scaling are likely to occur. *Ochres, china clay, whitening, etc., should not be used for priming or under coats.* If work is primed (outside work) with ochre, venetian red, gray ochre, etc., blistering and scaling will follow in time. These materials should not be used. You should use white lead for priming and not more than ten per cent of ochre. Old paints and fat, rancid oil, altho cut with turpentine, will surely give you trouble. None of these primers dry hard. The outer surface, or last coat, dries first, the under coats remain soft and gummy. When the sun hits the surface, it boils your fatty primer, gas forms, your last coat must expand or there is no chance for it to escape and your last coat blisters. Many of you have had this same thing happen.

The Painter is Often Unjustly Blamed.

Sometimes you do a perfectly nice job of painting, but when the hot weather comes blisters will form and at times peeling will follow. The property owner calls you up and says some unpleasant things, tells you that he did not think you would skin the job, etc. Or it sometimes happens the owner merely tells friends about it and spreads talk that is not likely to benefit your reputation. It is not unusual for the blistering to occur before the job has been paid for. When your bill is presented, the property owner blames the painter. The painter replies that he painted the house according to Hoyle, used good materials and did the work properly. The painter states further that the blistering is due to previous coats of paint, for which he is not liable, and that any paint chemist or experienced paint man will confirm his statement. This being the case, the painter says, "Now, you can pay the bill." But, suppose the painter is new, ignorant in paintology and does not know the "how and why" of paint troubles. He does the job and when the complaint comes simply says, "I am sorry the job did not turn out right." But because he does not *know* why it went wrong and assumes the blame himself in spite of the fact that he only got one hundred dollars for a \$125.00 job, he agrees to make it right. It costs him, say \$15.00 to go over the work to patch it up and when he gets thru the job looks worse than ever. The painting business is the same everywhere. If you know what causes blistering, scaling and cracking, you can stand up to your customers without fear or favor, give them their money's worth and insist on your rights.

Non-Dryers.

Many of the store fronts, front doors, sash and considerable of the trimmings on houses that have been painted in dark colors, composed mostly of ochres and lamp black, I find are generally tacky, blistered or cracked. These colors having neither lead nor zinc in them are naturally slow dryers and, when a job is found in that condition and painted with white lead and oil, or any good mixed paints, it is bound to crack or blister. Lamp black, yellow ochre, venetian red and Van Dyke brown are very slow or non-dryers.

Removal of Old Paint.

Do your work according to agreement and take into consideration the condition of the job. If you find the old paint blistered or in general bad condition, take the job, but inform the property owner that, on account of the condition of the old paint, any new paint is apt to crack, scale or blister, no matter what material is used or by whom it is painted, unless the defective paint is removed by the use of a blow torch. The use of the blow torch to burn off old paint invalidates insurance policies ordinarily and a special permit from the insurance company should be secured. Should the building catch fire or burn down while you are doing the work, the property owner will get his insurance, but the chances are the insurance company will in turn collect from you, holding you responsible.

For painting fronts, front doors, etc., where dark colors are insisted upon, I should advise you to use drop black either ground in oil or Japan instead of lamp black for deepening the color, whatever it may be. For good results, where sashes are to be painted black, drop black ground in oil, with the proper amount of dryers and turps (one-third of drop black in Japan, with two-thirds of lamp black), will give the best results.

Some Causes of Scaling.

Considerable scaling is caused from the wrong primer, and also from priming the woodwork in damp condition. The blame can also be put to a poor or adulterated oil, or from the use of too much ochre, dope oil and benzine. A job upon which fish oil, paraffine oil, petroleum or gloss oil is used, no matter what material is used in the succeeding coats, will go wrong. You cannot tell by looking at the job what material has been used, and a chemist could not tell. The painter who applies the last two coats is accused of the failure of the job.

"**A**RT is that imaginative expression of human energy which thru technical concretion of feeling and perception, tends to reconcile the individual with the universe by exciting in him impersonal emotion, and the greatest art is that which excites the greatest impersonal emotion in any hypothecated perfect human being."—*Galsworthy*.

THE MINNEAPOLIS CONVENTION

ONE of the speakers at the Minneapolis convention of the National Society for the Promotion of Industrial Education, stated that unlike many organizations which preach a variety of doctrines to the same audience, the National Society each year propounds the same doctrine to a new audience. In a large measure this is true, and the meeting in Minneapolis was in some respects quite similar to former meetings. It was marked by a great increase in attendance and a prevalence of a greater degree of mutual understanding. The western states were more fully represented than at former meetings. Organized Labor was represented at each meeting by members of the local, state and national federations, the representatives taking an active part in many of the discussions.

Many factors combined to make the meeting an unusual one. The weather which had been cold and disagreeable with the temperature 33 below zero was mild and delightful. The Burlington Railway ran a special train from Chicago and return for the convenience of delegates. The hotel accommodations were adequate and the meeting places near at hand. The meetings were exceptionally well attended. Five members of the Chicago Board of Education and many boards from smaller cities were in attendance. The American Federation of Labor was represented by several delegates from eastern cities.

The program was of a high order and covered every phase of vocational education. The chief topic of discussion was the report of the Minneapolis Vocational Education Survey which was submitted a few days in advance of the meeting. The Survey covers the public and private schools, and many of the skilled industries for which it was thought that training might be given. The report recommends many changes in the public schools and suggests a program for the Dunwoody Institute, which under the terms of the will which provided the fund, must be free to the youth of Minneapolis and the State of Minnesota.

It seemed to be the general feeling of those who attended the convention that the report of the survey was fair to all parties, that neither the schools nor industries were unfairly criticised and that a feasible program had been suggested for the schools. The trade agreements providing for the co-operation of schools, shops, employers and employes in training for efficiency, thru all-day, evening, and dull season schools was considered the greatest contribution of the Survey to the movement for vocational education.

As a rule the speakers recognized that this meeting was held for the discussion of a special type of education, and that while every one recognizes the need for general education, that the subject under discussion was vocational education. Occasionally, however, a speaker took a balloon ride, painting pictures of a beautiful Utopia, forgetting the practical problems to be solved before that ideal condition can be attained.

No doubts were left in the minds of those who attended the meeting concerning the attitude of the American Federation of Labor toward vocational education. The Federation favors vocational education under the proper conditions, and under *unit* control. During the conference on Federal Aid to vocational education, this fact was emphasized quite emphatically.

The meeting is the first one under the management of the new Secretary, Mr. Alvin E. Dodd, and considerable credit is due him for the success of the Minneapolis meeting.

The National Society has shown itself to be an efficient organization,—one that accomplishes results. Its leaders have proven themselves to be men of high ideals and ready to back their convictions with their funds.

Some have contributed of their wealth to the society with no thought of financial returns. But if the society is to gain and hold the respect and confidence of the educational and labor interests of the country, there must be a greater degree of democracy in its organization and in its meetings. That condition which leads one to feel that everything has been pre-arranged, is conducive to suspicion. One expects to find those conditions in a political convention but he also expects to have things put over on him there. There should be some method of choosing committees whereby the membership should have a voice in the choosing. No doubt the same nominating committees, and the same officers would be elected and the same policies adopted, but the members would attend the business meetings in larger numbers, and would feel that they were a part of the society.

The following extracts from the program indicate the general trend of the papers and the discussions:

Learning to Earn.

"We are among the world's great industrial peoples, striving mightily for our place in the commercial sun. We need that place to keep our workmen employed and their families happy, but we omit a necessary thing to win and hold the position for which we strive. We train the physician for his job, the lawyer for his profession. We teach the veterinary how to care for the horse, and we even expect a dog to know his job. With exceptions, excellent indeed, but all too rare, we are letting the city boy and the mechanic's son go it alone. We are so busy with winning our way, so concerned with our own national, state, and local affairs that a great problem like the wasting of our youths has been almost untouched.

"Hence it has come to be that years of a young mechanic's life are wasted in the learning how to earn his living after he has reached the time of life when it is his desire and duty to earn that living. Here is a weakness and a waste that may well alter the place of the United States in the commercial and industrial world.

"We are coming to see an unfilled gap in that which we have been pleased to call education. I have seen it from the factory end, in the solid procession of the untaught that enter every mill and factory in this country often only to be tried in the balance and found wanting. Many a mechanic and working man and mother too has suffered with and for his and her children because they were not and they could not be fitted to do the work of life. We have taught something to the mind. We have given the proceeds of books to our children but we have taught too little to the hand and too little that life was a very practical and a very stern thing, into which many of these children had to go at tender years unfitted for the combat. There is no man that has faced the world alone, certainly no man that has ever come along into a great city a stranger, that does not keenly sympathize, when once he is informed, with the thousands of our boys that leave what we are pleased to call schools, untrained and almost wholly untaught to do anything useful in the world.

"We hope that the day may come when in this country there is an end to incompetence. We are looking ahead to the time when there is an added effectiveness to man and mill, when we shall have greater competing power in the world's markets because we shall do things with less effort, less waste and in less time."

Hon. Wm. C. Redfield, Secretary of Commerce.

Vocational and General Education.

"It may be safely predicted that by 1925 the very great differences between sound general education and effective vocational education, as to purpose, materials and

methods of instruction, will be so well defined in the public mind, that the academic schoolmaster will not be able, as he is now able, to beguile and deceive the public as to what he is intending and doing.

"In no respect do the traditions of general or academic education persist longer than in relating general or liberal education to vocational education.

"Where educational administrator or schoolmaster is put in charge of vocational education he finds it difficult to forego the opportunity to force his pupils to continue their general education. In the so-called commercial school he so blends general courses with courses purporting to be vocational that the resulting program is probably in most cases ineffective for either purpose.

"It has been the boast of principals of technical high schools (which parents and the public at least fondly believed were vocational) that they could give a complete general high school education, while teaching the so-called technical subjects—with the result that experts find that, with rare exceptions, the technical high school is not a vocational school at all, and simply offers an inferior high school education at materially greater cost than the regular high schools.

"It is predicted that many, if not most, forms of vocational education will in the future involve three stages, as follows:

"(a) An introductory stage, when the youth is about to get ready for an occupation, or about to pass from a lower grade occupation to a higher grade occupation, when he will attend a day vocational school for full time, such full time attendance ranging, according to the occupation to be prepared for, from a few weeks to two, three or four years.

"(b) This will be followed by a second stage on some part time, preferably half time, basis, where the youth will participate, on a wage-earning basis, in the occupation, but will give sufficient time to the vocational school to bring about a fuller development of technical knowledge. The school itself will have constructive oversight of the learners' work in the occupation, and the wage paid by the occupation will be reduced sufficiently to justify the presence of the young worker as a learner.

"(c) A third stage will consist in extension classes for persons already employed for full time.

"The first two stages will be under the direction of the school, and may eventually be made compulsory; at any rate, they will involve compulsory attendance up to 18 years of age. The third stage will involve voluntary attendance.

"On the pedagogical side, the most probable development of vocational education in the next few years, in both day and evening schools, will be a further amplification and differentiation of the so-called "short-unit courses." Short-unit courses have in them almost unlimited possibilities for effective teaching at comparatively small cost."

Dr. David Snedden, State Commissioner of Education for Massachusetts.

Make Manual Training Practical.

Mr. William J. Bogan of the Lane Technical High School, Chicago, stated that the report of the Survey on Manual Training had been submitted to a committee of western men which met in Chicago, early in September. In approving of the report as a whole, the Committee laid special emphasis on the following points:

1. That the elementary schools should be so organized as to offer a wider variety of manual activities for all children.

2. That in the upper grades of the elementary schools prevocational courses should furnish pupils who desire them opportunities to gain definite knowledge about the specific practice in several of the most important industrial

and commercial arts in order to (1) interest and hold motor minded children; (2) furnish new avenues of expression in learning and doing; (3) aid in the proper training in book subjects; and (4) help young people to select the kind of training and the kind of occupation they desire to follow.

3. That the Intermediate school or Junior High School is the best administrative agency yet devised for meeting the need of training in the manual and industrial arts for adolescent boys and girls; and that the training in each of these arts should be varied in kind and grade but should be sufficiently constant for a considerable period of time to meet the varying interests and requirements of different groups. This training should enable individual pupils to select that kind of work for which they are best adapted.

4. That short courses meeting the vocational needs of different groups be offered in the high schools and that these courses be open to all graduates of the elementary schools who wish specific vocational training, either at the beginning of a high school career or at any time during the high school years, when the pupil seeks more direct preparation for a vocation; and that this could be accomplished in part at least by admitting pupils of the early high school years, who desire it, to shop courses of the high schools now reserved for pupils of the late high school years.

5. That the four-year technical course already approved by the Minneapolis Board of Education, the aim of which is to give boys seeking advantageous entrance to industry on its business and directive side technical preparation in addition to a good high school education, is especially to be commended.

6. That, in order to be successful, any vocational course must have the hearty support and co-operation of all interests in the vocations concerned and must, in order to meet the requirements of any vocation, have information and advice which only those in the vocation itself can give. This requires, even in the case of the public schools, supported by the public and responsible to the public, the use of the advisory committee made up of employers and employees, thru which the school in each of its vocational courses gets contact with the vocation.

Home Making as a Business.

The Committee appointed to deal with the training of home workers was headed by Miss Bess M. Rowe of the University of Minnesota. In discussing the recommendation, Miss Rowe reported:

"Modern industrialism has taken from the family group most of the gainful productive activities, forcing the man partner, the father, out of the home to follow productive occupations and thus gain an income, depriving the woman partner of her share in these productive occupations, and leaving her a work in the home which has to do with the consumption of goods and which was formerly shared by the man. The work left to the woman partner in the home, is that of director of consumption.

"The woman must be trained for her business. It is no more possible for a woman to manage a household instinctively than for a man to succeed in a business of which he knows nothing. Just as training girls and women for their wage-earning occupations in commercial and industrial lines is an important educational problem which is beginning to show its influence upon better conditions for wage-earners, so the educational problem of training for the business or profession of home-making is bringing and will continue to bring better conditions, greater efficiency and increased happiness.

"A knowledge of the fundamental principles of nutrition in relation to good combinations is more important than an exhaustive knowledge of old time formula, known as recipes.

Attitude of Labor.

"The only way to avoid working an injury to labor under the name of industrial education is to find out what is the demand for labor in a community. In a word, it seems to me that the only safe basis for undertaking industrial education in any community is the basis which has been established here in Minneapolis. Industrial education should be in every instance based upon a survey of the industries of the community—upon an accumulation of facts regarding the employments of the community. Upon such a basis the public schools properly proceed to provide for the particular industrial needs of the community, and with such an accumulation of data in hand there can be no excuse if industrial education does not prove to be of undoubted benefit to labor and to the community.

"Trade agreements are not going to be violated, and they give employer and worker an opportunity to meet as man and man, rather than as czar and serf. It will mean that the employer will obtain good work and the employee will obtain a living, decent wage.

"Vocational training and industrial education for girls will do much to raise the standard of what are now 'despised vocations.' Nursing, stenography and similar occupations are now higher than others because the workers in them are trained. When girls in the trades are trained, it will cause them to respect their work more. This applies to men as well as women."

Mrs. Sarah Conboy, International Secretary-Treasurer, United Textile Workers of America.

Making Economic Orphans.

"Exclusive association of the growing child with other children, supplemented by light contact, for a few hours a day, with unmarried women teachers in the elementary schools, can hardly be considered an adequate preparation for vocational life in the 20th century.

"If the figures in regard to those who fall out of school before completing the high school course mean anything, they mean the kind of education, general or commercial, now offered is not such as appeals either to the children or their parents.

"Can we justly oppose vocational courses on the ground that it commits the child to a particular vocation at too early an age? The answer is, better commit the child to any vocation and give him adequate preparation for it than deny him preparation for any and all vocations and then turn him loose as an economic orphan."

John H. Gray, Professor of Economics, University of Minnesota.

"Inasmuch as any plans for vocational secondary education in a town or city must adjust themselves to present day conditions in the industries, it is necessary to consider not only the processes and demands of the trades and occupations upon the worker but also the attitude of both employers and employes in the trades as to the kinds of training needed, the ways in which the training can best be given, and what arrangements the employers, employes and the schools shall agree upon as to the following:

"1. The conditions under which the new workers are to be trained and received into the trade or occupation.

"2. The credit towards the period of apprenticeship to be given any course of training in the schools either before or after employment.

"3. The training in schools as well as shops to be required of the apprentice after employment.

"4. The preference given to local and trained workers in hiring and promoting in the trade or occupation.

"In order to guard against misunderstandings and in order to prevent future complications and difficulties it will in many instances be necessary to prepare a written bill of particulars which determine somewhat in detail the conditions under which the three most interested

parties are willing to co-operate in carrying on the work of vocational education."

Dr. George E. Barnett, Professor of Statistics, Johns Hopkins University.

Dual and Unit Control.

"The condition of efficient control must be set up by some agency, whether unit or dual, or by a combination of both. I have been impressed with the strength of position of each side in the classic controversy now occurring. My own experience leads me to believe that an effective industrial school cannot be organized, established and placed upon a going basis without the degree of freedom best in promise under the system of dual control.

"I am also convinced that there is considerable danger in building up two educational authorities such as the dual system threatens; in creating influences that would threaten to separate educational forces into two competing and hostile camps. The adherents of the dual system have in mind the success of a single type of school; the advocates of the unit system, the permanent good of the educational system.

"I have sometimes thought that a compromise plan might be possible, namely, the adoption of a temporary dual system during the period of foundation, organization and experimentation; afterward, at a stated time, five years as a suggestion, turn the going concern over to the major forces vested with general control of educational affairs.

"There is possible no easy transition from the general school as now maintained or from the technical high school to a type of effective industrial school. Many communities are still unconvinced of the truth of this proposition, and are either trying to effect the impossible end or are proposing to make the attempt. Some of those that have tried and failed have concluded that the trouble is in the project itself, and have not seen that the difficulty was merely in the method used. There is no type of school so dependent upon favorable conditions as the industrial school. A defect in any of the conditions may easily render abortive the proper functioning of the other factors. It is not strange, consequently, that an effective industrial school should show the same sensitiveness to conditions which characterizes the highly organized industries it is preparing young persons to enter."

Frank V. Thompson, Assistant Superintendent of Schools, Boston.

In a short business meeting held Saturday noon, the following officers were elected:

President: Hon. Wm. C. Redfield, United States Secretary of Commerce.

Vice-President: Cheesman A. Herrick, President Girard College, Philadelphia, Pa.

Treasurer: Frederic B. Pratt, Pratt Institute, Brooklyn, N. Y.

Members of Board of Managers:

John Golden, President United Textile Workers of America.

Ernest M. Hopkins, New England Telephone and Telegraph Company, Boston, Mass.

Isabel Ely Lord, Director School of Household Arts and Science, Pratt Institute, Brooklyn, N. Y.

William B. Wilson, United States Secretary of Labor.

F. W. Thomas, Supervisor of Apprentices, Atchison, Topeka & Santa Fe Railway System, Topeka, Kan.

Clarence H. Howard, President Commonwealth Steel Co., St. Louis, Mo.

H. M. Gardner, Vice-President Gardner Hardware Co., Minneapolis, Minn.

C. A. Prosser, Director Dunwoody Industrial Institute, Minneapolis, Minn.

The last three named are new members on the Board.

Resolutions expressing the appreciation of the hospitality of the City of Minneapolis were unanimously passed. The resolutions also reaffirmed approval of the Smith-Hughes Bill now pending in Congress, appropriating Federal funds for stimulating and supporting vocational education. The Constitution was amended to provide greater representation of members in the Executive Committee.

Employment Managers Confer.

Immediately preceding the convention of the National Society for the Promotion of Industrial Education, a formal conference of employment managers from various parts of the country was held in the Radisson Hotel of Minneapolis. The questions discussed dealt with effi-

ciency in the employment of help and its relation to the conservation of human resources. Representatives of the Boston, New York, and Philadelphia employment managers' association, the Boston Vocational Guidance Bureau, the Tuck School of Finance and Business Administration of Dartmouth College, the Minneapolis Civic and Commerce Association, and Organized Labor took part in the discussions.

The point emphasized in the discussions was the necessity of trained employment managers. The selecting, assigning, directing, supervising and developing employes and supplying opportunities for promotion were said to be fully as important as the training of men for efficiency.



A MOTHER'S CLASS IN DOMESTIC SCIENCE.

A domestic science class of exceptional interest is shown in the above photograph. The class is composed of the mothers of children enrolled in the Portland School, at Louisville, Ky., and has been in operation for the past five months.

The class has a membership of 24 women, who meet every Friday afternoon with their instructor. It was organized upon the suggestion of Miss L. E. Levi, Principal of the School, for the benefit of the Parent-Teachers' Association, and was opened early in the fall.

The course consists of eight lessons, and the work is of a practical nature adapted to the needs of the busy housewife and mother. A study of food values and their different applications is made. The women are shown new ways of preparing old dishes; recipes that are simple, economical, wholesome and time-saving are given.

The class has met with a hearty support on the part of the members. It has demonstrated the practical value of domestic science in the schools and has enlisted the co-operation and sympathy of the parents in a gratifying manner.

INDUSTRIAL-ARTS MAGAZINE

Board of Editors

WILSON H. HENDERSON Milwaukee, Wis.
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EDITORIAL

PREPAREDNESS.

IN times like the present it is difficult to maintain mental equilibrium and a true perspective in viewing world events. We are inclined to see only the most glaring of causes and effects and to disregard the fundamental elements in the situation. Startling statements have recently been made about the unpreparedness of the United States to repel an invading army. The country is being urged to purchase immense armaments, and a larger army and navy are recommended. Some have become so hysterical as to demand universal training and service in army posts. All this is in preparation for meeting a foe which exists only in the imagination. While there may be a remote possibility of our having to meet an armed foreign force, there is an absolute certainty of our having to meet the competition of foreign industrial forces which have been trained for efficiency.

A very little thought on the subject will lead one to realize that the present war is not being fought in the spectacular way that was pictured in our school histories—men in picturesque uniforms riding on fiery steeds with battalions of soldiers marching to the tune of fifes and drums and carrying muzzle loading rifles and powder horns. This war is being fought with machines, automobiles, submarines, motorcycles, siege guns and aeroplanes, made and operated by trained men. Furthermore, this training consisted of vastly more than setting up a tent, marching in perfect rows, and shooting straight with a rifle. The operation of present day war machinery requires men with mechanical ability and scientific knowledge. The man who finds the range for the gunner does so mathematically, and the man who aims the gun does so mechanically without ever seeing his target. The explosive power of a certain weight of the charge, the weight of the projectile, the angle at which to place the gun, and the motion of the target, all have to be determined with perfect accuracy.

All the army training which could be given to every man in the country would be absolutely useless in a time of war without a large supply of skillful men who can manufacture the armament, the shells, the auto trucks, the aeroplanes, and the huge guns for the army. These supplies cannot be made years before needed for they will be obsolete in a very short time. It has been said that an army depends upon its stomach, which requires that any country at war have trained farmers who can produce the food for the army.

The cost of one battleship would endow an immense

vocational school and is many, many times the annual appropriation for the United States Bureau of Education. The cost of firing one of the big guns would put a boy thru a vocational school. But a torpedo can send ship, guns, men and all to the bottom of the ocean. At best, the battleship is worthless in a very few years and is finally used as a target for some more modern ship. Its cost if invested in education would be multiplied immeasurably in the same length of time.

We believe in preparedness, but in a type of preparedness which will outlive the destructive usefulness of a battleship. We also believe that our country should build battleships, but as sure as battleships are built, just so sure will some one build better ones, and then men will be needed who can build still better ones.

So while we are preparing for emergencies, we should also be making permanent plans to insure the permanency of our prosperity and efficiency. Only the presence of the crudest sort of statesmanship will allow our present Congress to appropriate money for a larger army and a larger navy without at the same time enacting a law providing Federal Aid to Vocational Education.

It is indeed gratifying to have some one make a real constructive suggestion, regarding the enlargement of the United States army. Such a suggestion has been made by Louis F. Post, assistant secretary of Labor, in which he states: "What I propose, if we must have a large army for defensive purposes, is to give an opportunity for the man who expects to return to civil life to utilize the last three years of his service, in which he now makes little or no advance in military efficiency, in fitting himself to earn a better living and to be a more efficient citizen.

"To the men who planned to return to civilian life, training in almost every skilled trade would be opened, and their last three years of service, with the exception of certain periods for drilling, would be spent in mastering a useful occupation."

In other words Mr. Post would turn every army post into a technical school training for peace as well as for war. It is our opinion that few ambitious young men will enter the army as it is at present organized and spend four years in comparative idleness, when at the close of that time they are turned out into the world unfitted to perform any skilled work efficiently. On the other hand if a technical education with board and clothing is offered, in addition to the military training, there are thousands of young men who will readily join the army. If the land grant colleges which receive large sums of money annually from the National Government, were to offer tuition, board and clothing to those young men who were willing to enlist for a four-year term in the U. S. Army, they would have so many applicants that they would have to double their equipment.

HIDDEN IDEAS?

MARK TWAIN once used a sentence which very aptly describes a large part of present day literature on educational topics, when he said, "One seems to know what

it means, and yet he knows all the time that he doesn't."

To one so inclined it is interesting to search thru such literature trying to find the idea that is so cleverly hidden therein, but to the layman with only a passing interest in the subject, such work means nothing. Educational practice will never catch up with educational philosophy until the public comprehends the principles underlying the philosophy. If we are interested only in developing a new philosophy, it matters little what we write or how we write it, but if we wish to influence practice what we write must be written in language that the layman can comprehend and in which he will have interest sufficient to cause him to read it.

COSTUMED TEACHERS.

MRS. RUTH CARSON BUTTS, the exponent of simplicity in dress, recently expressed to an audience of Normal teachers of Boston several pointed conclusions concerning teachers' dress:

"Teachers should dress in a professional way," said Mrs. Butts. "White attire is most expressive of the teachers' profession." "Bracelets, pins, and other articles of jewelry are entirely out of place in the costume of the teacher."

We read in the report of this address that a murmur of protest finally arose from the teachers when Mrs. Butts expressed the conviction that "silk stockings at two dollars a pair are beyond the purse of the school teacher, and therefore are not advisable."

In view of accepting the first conditions we would join in the protest for silk stockings, since it is evident that if teachers reduce their wardrobe to plain white gowns without jewelry, they might easily afford to pay the two dollars for silken hose. However, we are inclined to protest against the uniformity of costumed teachers. We cannot forget the ideals of our boyhood represented by some teachers of individual style who ruled over us by force of their aristocratic presence, while other "plain little wrens" could never cause a flutter of our adolescent hearts.

Individuality is a large asset with successful teachers, and individuality in dress may be a strong expression of the individual.

EQUIPMENTS.

WHETHER or not schools are over-equipped or under-equipped depends to a very large degree upon the locality, the school, and the purpose of the courses from which conclusions are drawn. There are undoubtedly schools that are in a sense over-equipped, or more accurately speaking, improperly equipped. There are, on the other hand, numerous schools under-equipped, not able to do the grade of work or the amount of work which their purposes demand.

The fact that an extensive equipment is not in operation every hour in the day does not necessarily condemn it as either over, under, or improper. The hours of apparent idleness may operate to lengthen indefinitely the years of service, provided the equipment is properly cared for during such idleness.

It is reasonably safe advice to say that the facilities at hand in the ordinary shop should be used to the limit of their capacity for good work without waste of time, energy, and material, before calls are made for large expenditures for additional equipment. There are too few people willing and ready to take a small, unpretentious equipment and show what surprising results can be obtained by its wise and efficient use.

CRITICISM.

AS DISCUSSIONS go on with reference to industrial work in the schools and suggestions are made for the extension and enrichment of such courses, there arise voices of protest.

The trend of such protests is against anything that challenges the wisdom of manual training work or evinces, even by indirection, the slightest doubt of the value of such work.

Such challenges and doubts are rather infrequent. It should be said for the comfort of those who are righteously jealous of the good name of their work, that suggestions for industrializing manual training or giving it a decidedly vocational bent usually are offered, not in an attack upon manual training as an educational force, but in *recognition* of it. There are certain fundamental facts with reference to the value of manual training in the school curriculum upon which educational thinkers are quite universally agreed. Such people consider that manual training has *established* its claim to certain vital and significant values and hence to an important place in the school. This being the case, they start with this *assumption* in offering suggestions for the vitalization and enrichment of certain of the courses.

Manual training teachers are certainly first to realize the imperfections of their work, and they certainly know best of all the causes of such imperfections. Among such causes might be mentioned ridiculously small allowance of time, inadequate funds, improper rooms and equipment, and lack of proper appreciation by some in authority.

But teachers in all the lines of industrial arts work should welcome intelligent, constructive criticism. Neither they nor their work can ultimately and permanently suffer from superficial, indiscreet, and unjust attack. However, every progressive teacher will take advantage of any criticism and attempt in so far as possible to remove conditions that might lead to such attacks.

Probably no difficult engineering problem has ever in the strict sense been completely solved. The engineer has to make assumptions, to use approximate theories, to decide between material and negligible considerations, and to allow for unknown contingencies. Now, scientific training, if sufficiently advanced, does enable us to solve most problems which are clearly stated and data given, but its usefulness does not end there. The trained engineer with incomplete data reasons correctly, estimates probabilities and knows the limit of the trustworthiness of his conclusions. He does not snatch at a pocket-book rule and ignore the assumptions on which it is founded.—*W. Cawthorne Unwin.*

PROBLEMS AND PROJECTS

THE Department of Problems and Projects, which is a regular feature of the INDUSTRIAL-ARTS MAGAZINE, presents each month a wide variety of class and shop projects in the Industrial Arts.

Beginning with January 1, 1916, the Magazine will award a monthly prize of \$10 for a meritorious problem used in the Department. This is not a prize contest in the ordinary sense. Every problem accepted for publication will be paid for. The prize will be simply a reward of merit.

From the material submitted by readers, the Editors will select each month for the award one problem of especial merit, judged from such standpoints as originality, good construction, artistic merit, adaptability to school work, and quality of drawings and photographs submitted.

The brief description of constructed problems should be accompanied by a good working drawing and a good photograph. The originals of the problems in drawing, design, etc., should be sent.

Problems in *benchwork, machine shop practice, turning, patternmaking, sewing, millinery, forging, cooking, jewelry, bookbinding, basketry, pottery, leather work, cement work, foundry work*, and other lines of industrial-arts work are eligible for consideration.

Drawings and manuscripts should be mailed flat and should be addressed:

The Editors, INDUSTRIAL-ARTS MAGAZINE,
Milwaukee, Wis.

SILVER CHEST.

George M. Brace, St. Paul, Minn.

THE reasons for introducing this problem in manual training work in a course in bench work are, first, the need for accuracy in doing good work. The problem does not require any unusual or difficult tool work, but does require accuracy in measurements and in joinery.

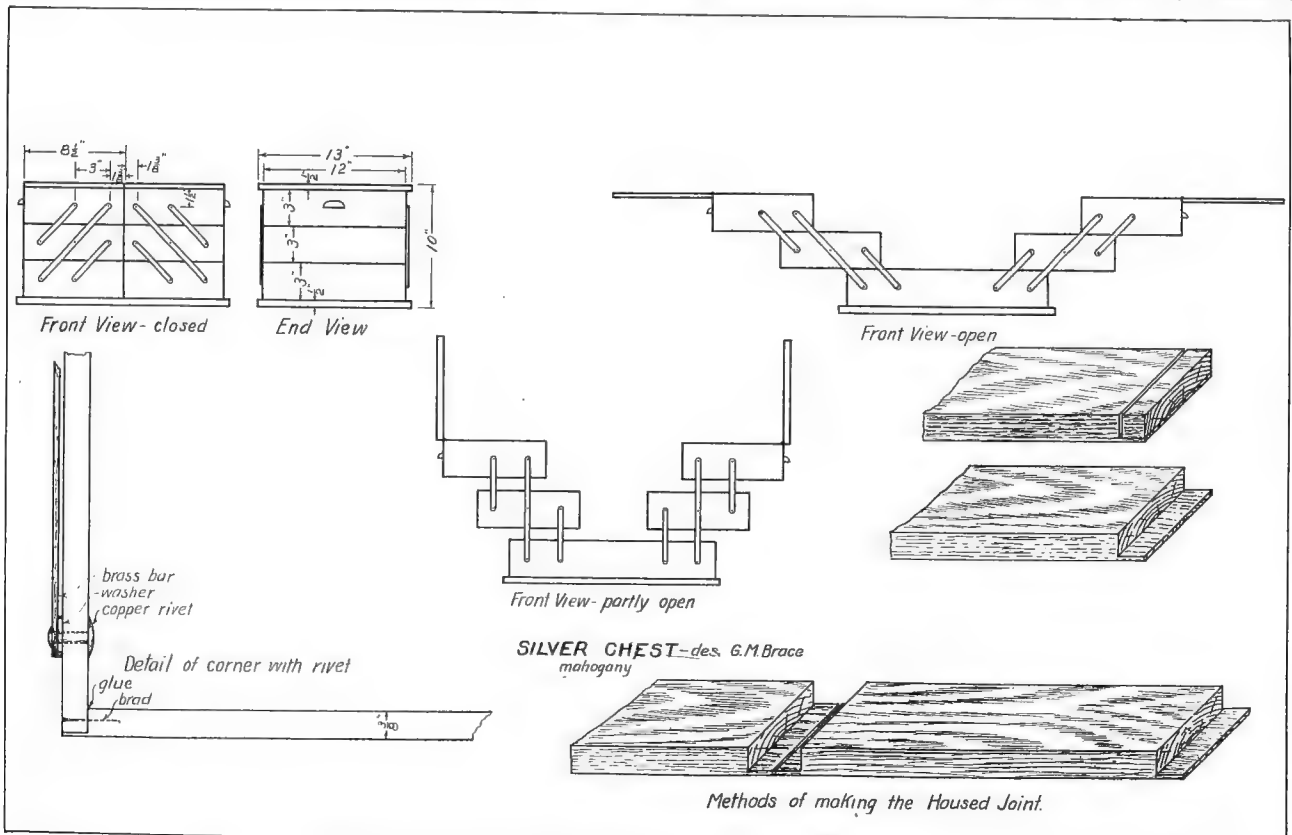
Second, the opportunity for good work in wood finishing, because it presents only flat surfaces of small area which can be easily rubbed down to a piano finish if desired. Third, the usefulness of the problem in the home. Fourth, the enthusiasm the problem arouses makes it possible to exact the best efforts of the pupil.

Construction.

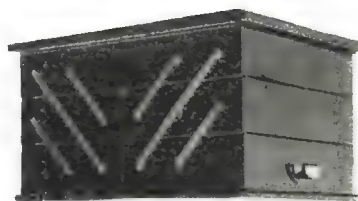
Lay out the side pieces on one or two long pieces planed to width and thickness. The housed joint is used at the corners which may be constructed in one of several ways. First cut out all pieces to size and lay out the housed joints with try-square and marking gauge; saw and chisel

out the joint. Second, lay out the pieces from one long piece; with try-square and gauge lay out the housed joints of two ends, saw down to gauge line, chisel and finish with router plane, then saw apart. Third, lay out joints as before and cut with a dado saw mounted on a circular saw. The shoulders of the housed joint must be square with the surface of the pieces to insure square corners; all pieces must be of the same length, and the bottom must be square and of the correct dimensions to fit properly.

Assemble the sides and ends with glue and brads; line each box with black velvet or chamois skin. With dividers and try-square lay off the holes in the sides for the rivets. This must be done very accurately to insure the proper opening of the boxes; drill the holes the size of the rivets used. Cut strips of brass $\frac{3}{8}$ " wide and $\frac{1}{16}$ " or $\frac{3}{32}$ " thick and lay off the proper length by measuring the distance between the holes and adding $\frac{3}{8}$ " for the two ends; file the edges smooth and straight; lay off the holes and drill them. Rivet the strips in place by inserting



DETAILS OF CONSTRUCTION FOR A SILVER CHEST.



Silver Chest.



The Chest Opened.

the rivets from the inside of the box and placing a washer on the rivet next the wood of the box, then the brass strip and rivet down with a ball pein hammer. Locate and fasten the brass draw pulls in the middle of the ends of the top boxes.

The staining, filling, and varnishing of the boxes should be finished before the brass strips are riveted on.

I have used this problem in my classes for fifteen years and it never fails to arouse enthusiasm, especially when introduced in time to be finished before Christmas. The enthusiasm is sufficient to insure good work because the pupils understand before they begin to work that the chest will not be a success unless accurately made.

I consider it one of the most successful problems I have ever used and have seen hundreds of them made in freshman joinery classes.

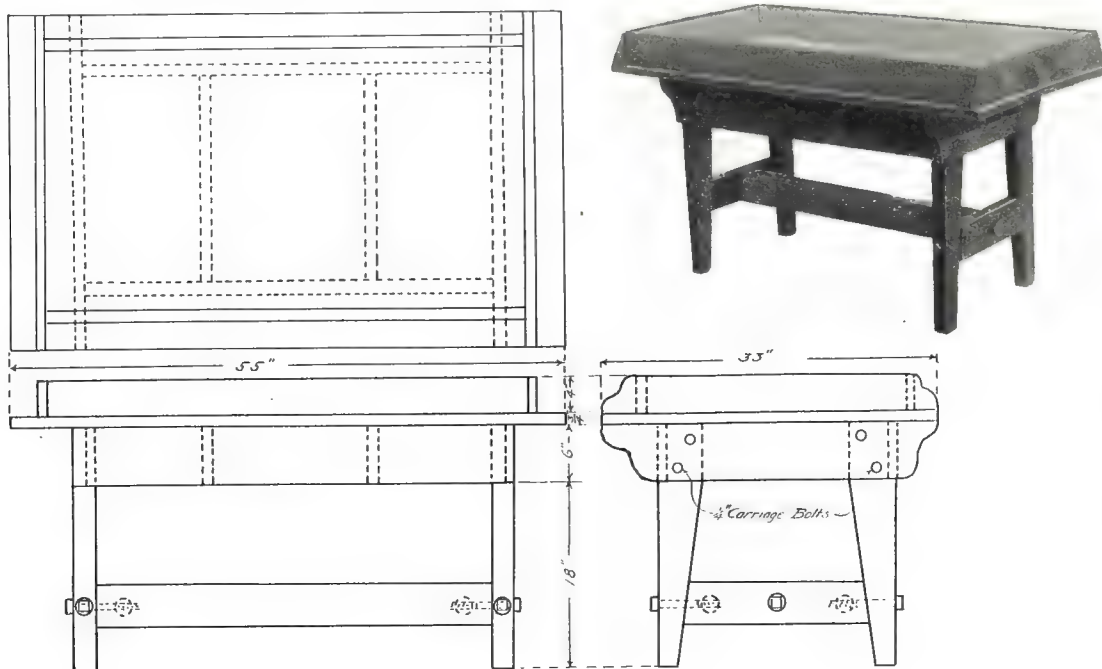
THE SAND TABLE.

C. H. Mohler, Pana Township High School, Pana, Ill.

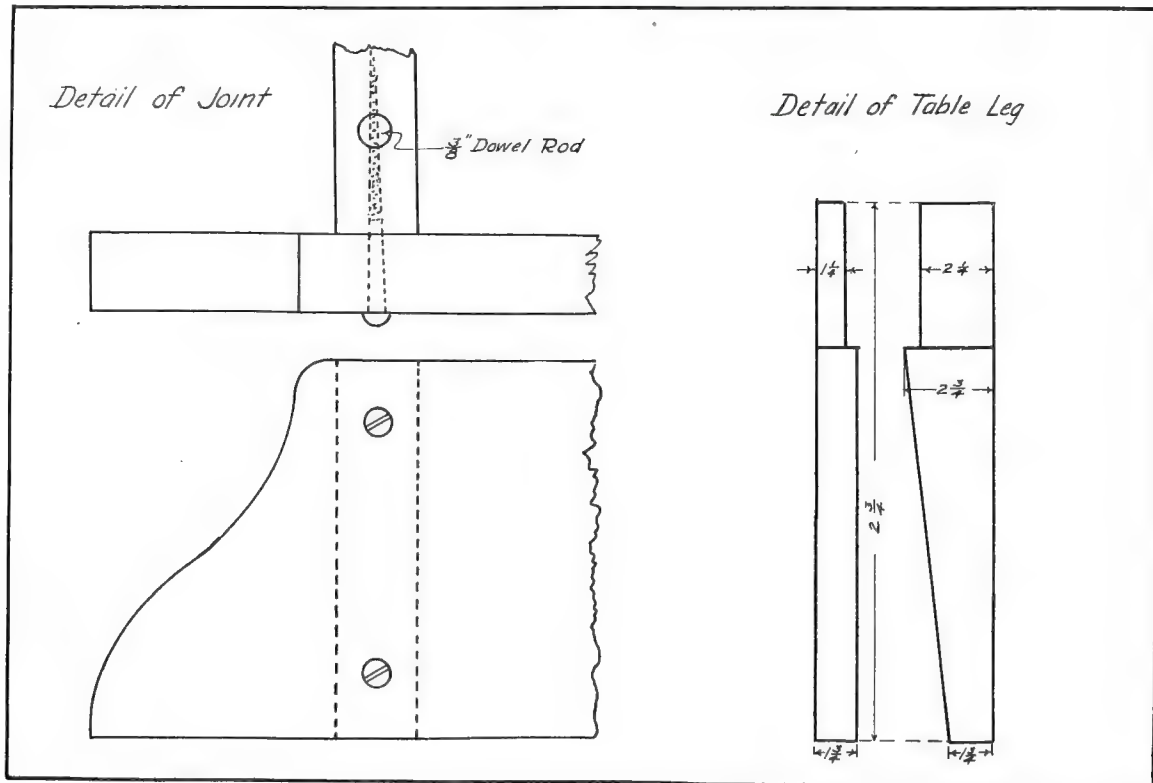
THE SAND TABLE illustrated on this page has been given to show some of the things made for the Pana schools by the boys of the sixth, seventh and eighth grades.

A number of detail drawings were made and one was given to the more rapid worker after he had completed his usual problem. The heights of all the tables were the same so that legs could be made and kept in stock. A point to be carefully watched was that the legs had the proper taper. They were tapered on the inside of the leg only. It took much thinking on the part of the boy to get the shoulder on the same side as the taper, and also to get them so that the four legs would member with each other. For these reasons it was found best to let one boy make the full set of four legs.

A few of the workers were able to make a satisfactory miter joint at the corners of the aprons, but on the whole it was found to be a better plan to let the end of the short apron extend to the outer edges of the table, and the longer apron butt against the shorter. The finish of the projecting ends furnished an interesting problem. In addition to the problem presented for solution, it gave a better support to the top of the table. In some cases, brackets were made to correspond with the ends of the aprons, so as to make an additional support for the edges of the table top.



SAND TABLE.

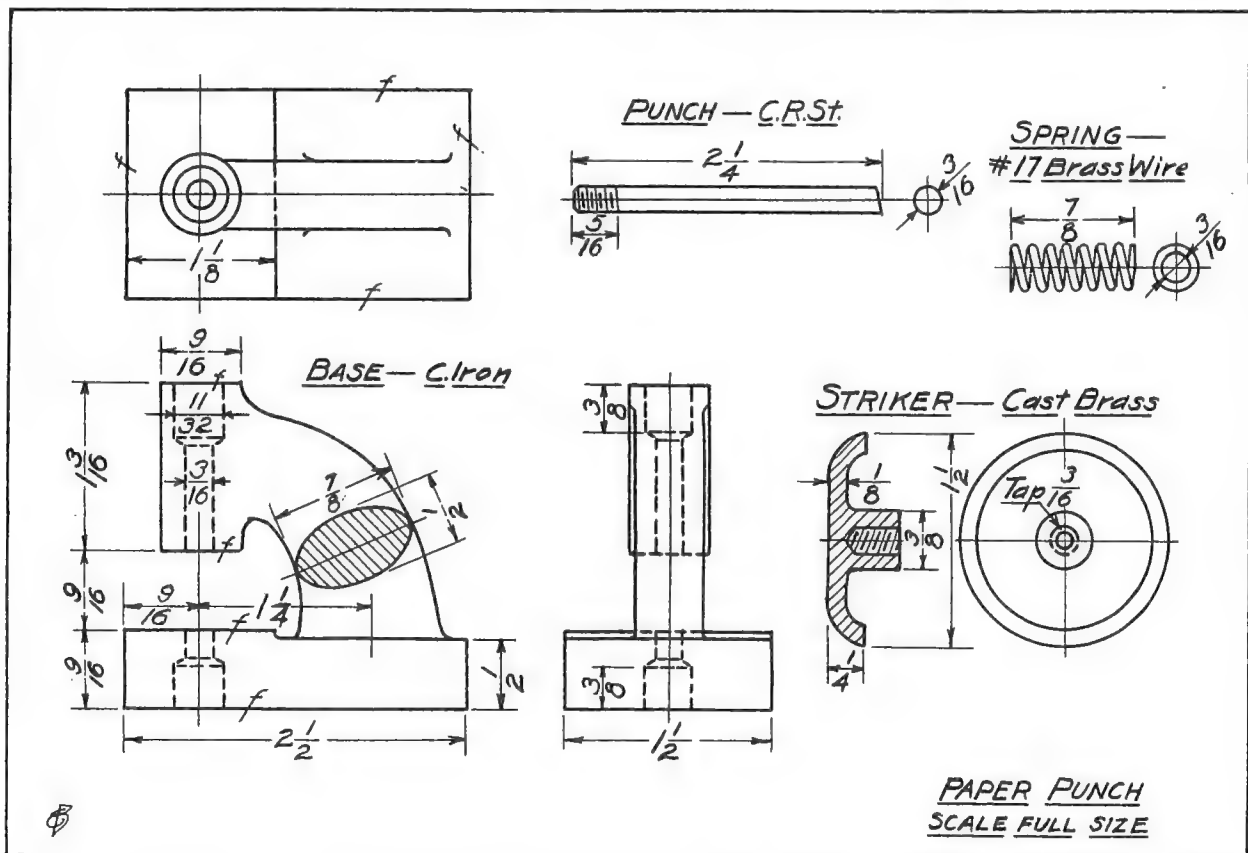


DETAILS OF CONSTRUCTION FOR SAND TABLE.

The table top, which formed also the bottom of the sand box, was made of matched, soft pine flooring. The sides of the box were made of four-inch cypress. The best made miter joint did not prove satisfactory. A stronger joint for the purpose was made by inserting a three-eighth inch dowell rod one inch from the end and edgewise thru

the end board. A two-and-one-half inch, round-head screw was inserted thru the side of the longer piece, into the abutting board, and thru the dowell rod. (See detail.)

The boxes were painted inside, and the rest of the table stained and waxed. Two boxes were made with hopper shaped sides but did not prove entirely satisfactory.

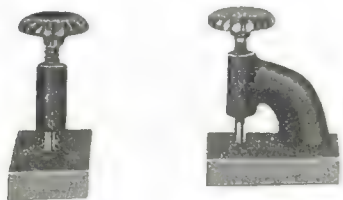


PAPER PUNCH.

THE PAPER PUNCH.

Edward Berg, Washington High School, Milwaukee, Wis.

THE paper punch is essentially a problem in filing altho it includes drilling, cutting threads with tap and die, and some lathe work. The casting is made with 3/16" material on the bottom surface of the base. The bottom surface may then be chipped and filed, or if it is thought



Paper Punch.

inadvisable to spend too much time on chipping, it may be machined in the shaper, milling machine or the lathe. All other finished surfaces have 1/16" material allowed for finishing. The scale is removed by grinding or with an old file, and they are then filed true with the base and to dimensions.

The punch is made of 3/16" cold rolled steel, threaded at one end to receive the striker and filed at an angle at the other end so that it will take a shearing cut. The hole which is drilled into the base to guide and receive the punch, should make a good working fit with it. A reamed hole would be proper but 3/16" reamers are expensive and easily broken. To obviate this and make a good working fit with a 3/16" shaft, the hole should first be drilled with a number drill which is one number smaller in size than 3/16", and then followed with a 3/16" drill.

The top surface of the striker is machined and

polished in the lathe. It is lacquered with banana oil so that it will retain its brightness. The spring may be wound in the lathe or in the vise.

The paper punch is very effective. It will punch holes thru a time table and can be easily sharpened. It is a problem of great interest to the students and altho it is essentially an exercise in laying out, chipping, filing and bench operations, to the boy it is essentially a paper punch.

REVOLVING KITCHEN UTENSIL OR TIE-RACK.

Chas. Franke, Public School 70, Brooklyn, N. Y.

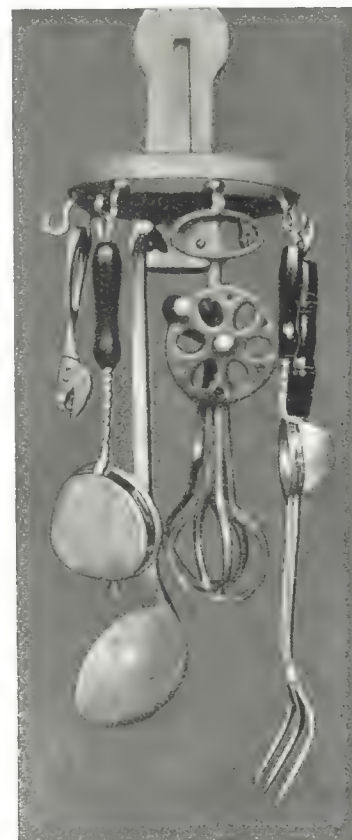
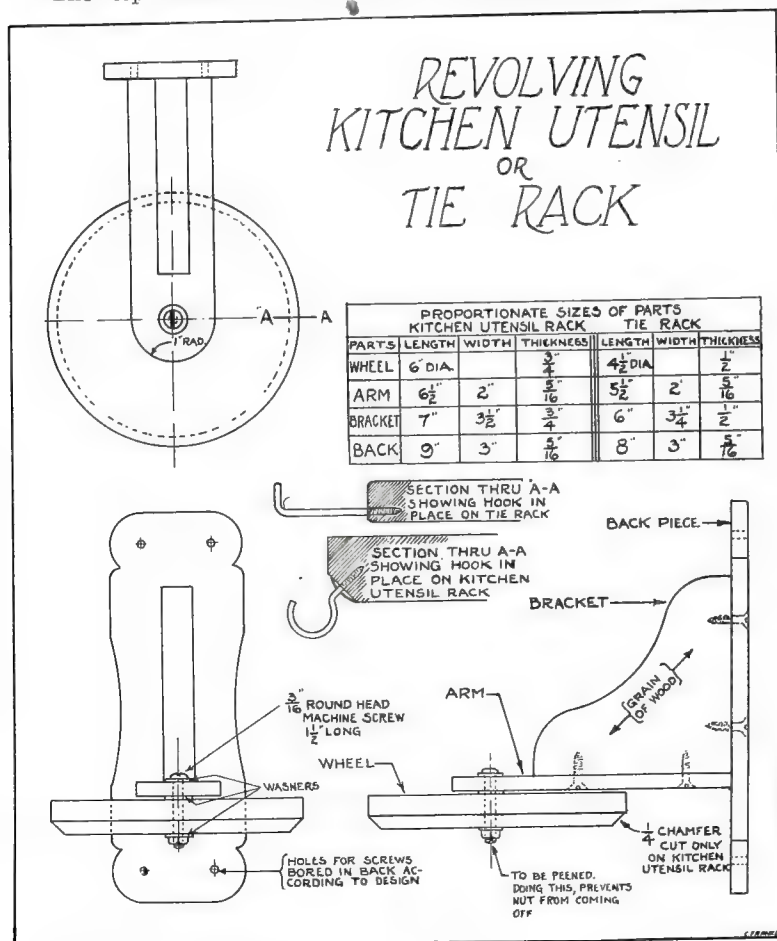
THIS rack was designed for the upper seventh-year boys, or boys who have had thirty hours of shopwork instruction in the seventh year.

The boys showed considerable enthusiasm in making the racks, due mainly to the utility of such a rack, and the possibility of working out individual designs on the bracket and back piece.

The procedure of work follows (refer to the table, "Proportionate sizes of parts" on the working drawing).

1. Stock to be cut out according to the table of "proportionate sizes of parts" allowing for suitable finishing to size. In sawing out the blanks for the brackets, it is well to have them cut in the form of right triangles, having the grain run parallel with the hypotenuse. The length and width as given in the "table of proportionate sizes of parts" represents the hypotenuse and the approximate altitude of the triangular blanks to be cut out. Less lumber is used by sawing out the blanks this way. And again, the boy finds less difficulty in cutting out the design of the bracket. The bracket cut this way also adds to the strength of the rack. A most suitable wood to use, and which can be easily worked by the boys, is poplar or white wood.

2. The first part to be made was the wheel. It was laid out to size. Numerous methods can be used in cutting it out. Sawing off the surplus wood at the corners



Revolving Kitchen Utensil Rack



THE DOG AS MADE BY THE AUTHOR'S STUDENTS.

and chiselling down to the line will give the boy experience in the use of saw and chisel, and one method of cutting out a circular piece of wood. He also learns by this experience the characteristics of the wood. After completing the chiselling, the edge can be sanded, and then the chamfer (which is only on the kitchen utensil rack) laid and worked out.

3. Then the piece for the arm is squared up and one end laid out and rounded off.

4. In working out the bracket, the edges, which form the right angle on the triangular blank, are squared. The design which has been previously worked out on heavy oak tag paper, is then transferred to the wood, which is cut out to shape and smoothly finished with sandpaper or wood files.

5. The piece for back is squared up, design applied and worked out.

6. Holes are bored as required in the pieces, after which they are thoroly sanded, and then assembled.

7. Appropriate finishing is applied according to the surroundings in which rack is to be placed.

TOY DOG.

P. H. Heron, San Diego, California.

THE toy dog was not a class project. The first one was made by the writer for a year-and-a-half old baby boy. Some of the students seeing the toy asked permission to make one like it by working after school hours. Before the first two were finished, twenty boys from different shops stayed after school to make a toy dog for some brother or sister.

In general appearance all the dogs constructed were the same. Individualism was shown by the various methods of finish and in the designs of the tails. Some of the dogs were enameled white with black spots, some gray and others black. Redwood was used for some and then the dog was shellaced and spotted some color.

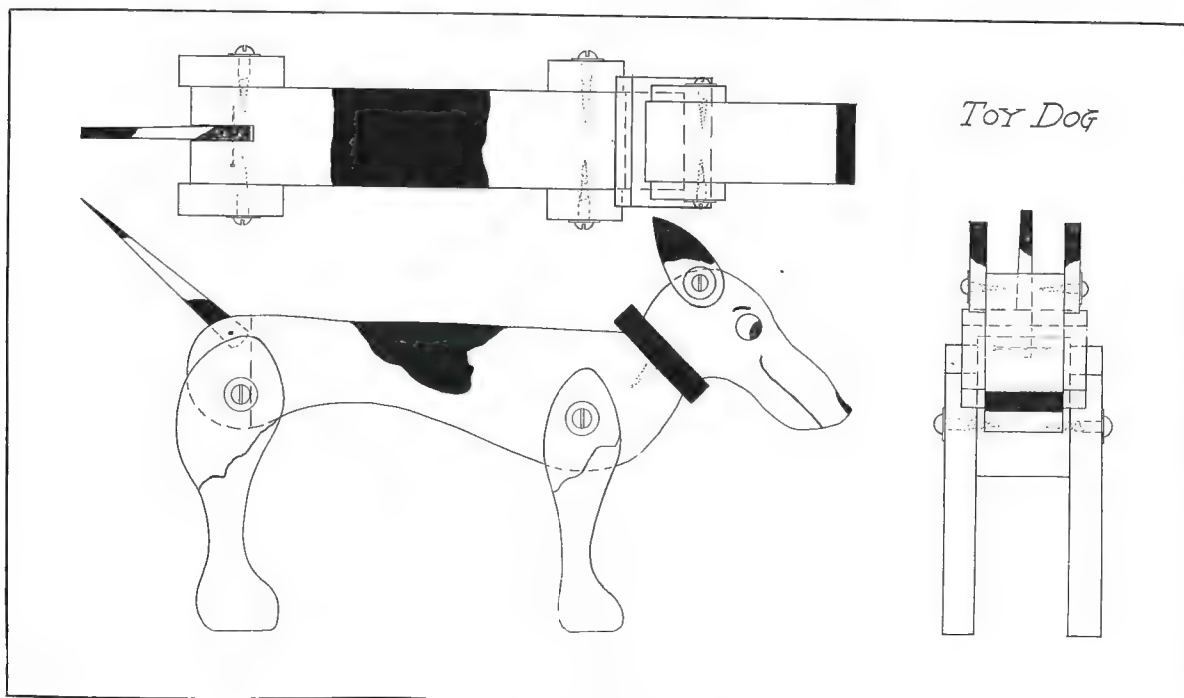
When the ranks of the toy makers increased a templet of each of the following parts of the dog was made: head, collar, body, front legs, hind legs, ears. As the tail was made in various styles no templet was made.

The general dimensions of the toy are:

Body	8"	long by	2"	wide by	1½"	thick
Head	3½"	"	1½"	"	1½"	"
Collar	2½"	"	2½"	"	1½"	"
Ears	1½"	"	1½"	"	1½"	"
Front leg	4"	"	1-3/16"	"	1½"	"
Hind leg	4½"	"	1½"	"	1½"	"
Tail					1"	"

Before assembling the toy, each part should be finished complete. The collar is held to the body by a one inch. No. 10 screw counter-sunk flush, and the head glued and braded on to the collar. The best method of doing this operation is first to screw the collar onto the body; then unscrew the collar from the body, glue and brad the head to the collar after which screw the collar back in place.

The legs are fastened on with No. 8, one inch round-headed blue screws using a 3/16-inch washer to protect the wood. The ears are fastened on with No. 6, ¾-inch round-headed blue screws. The tail is held in place with a one-inch brad which is counter-sunk.



DETAILS FOR A TOY DOG.

PLACKET MODEL.

Marian L. Whitwood, Instructor in Domestic Science and Art, Tulare High School, Tulare, Cal.

TO ENABLE pupils to put plackets and cuffs on sleeves of tailored waists or men's shirts, I give them a "Placket Model," the directions for which can be followed in making cuffs and plackets for a garment by remembering that *Piece A* represents the sleeve of the garment.

Piece A—5"x7", slit 3½" lengthwise. See Fig. I.

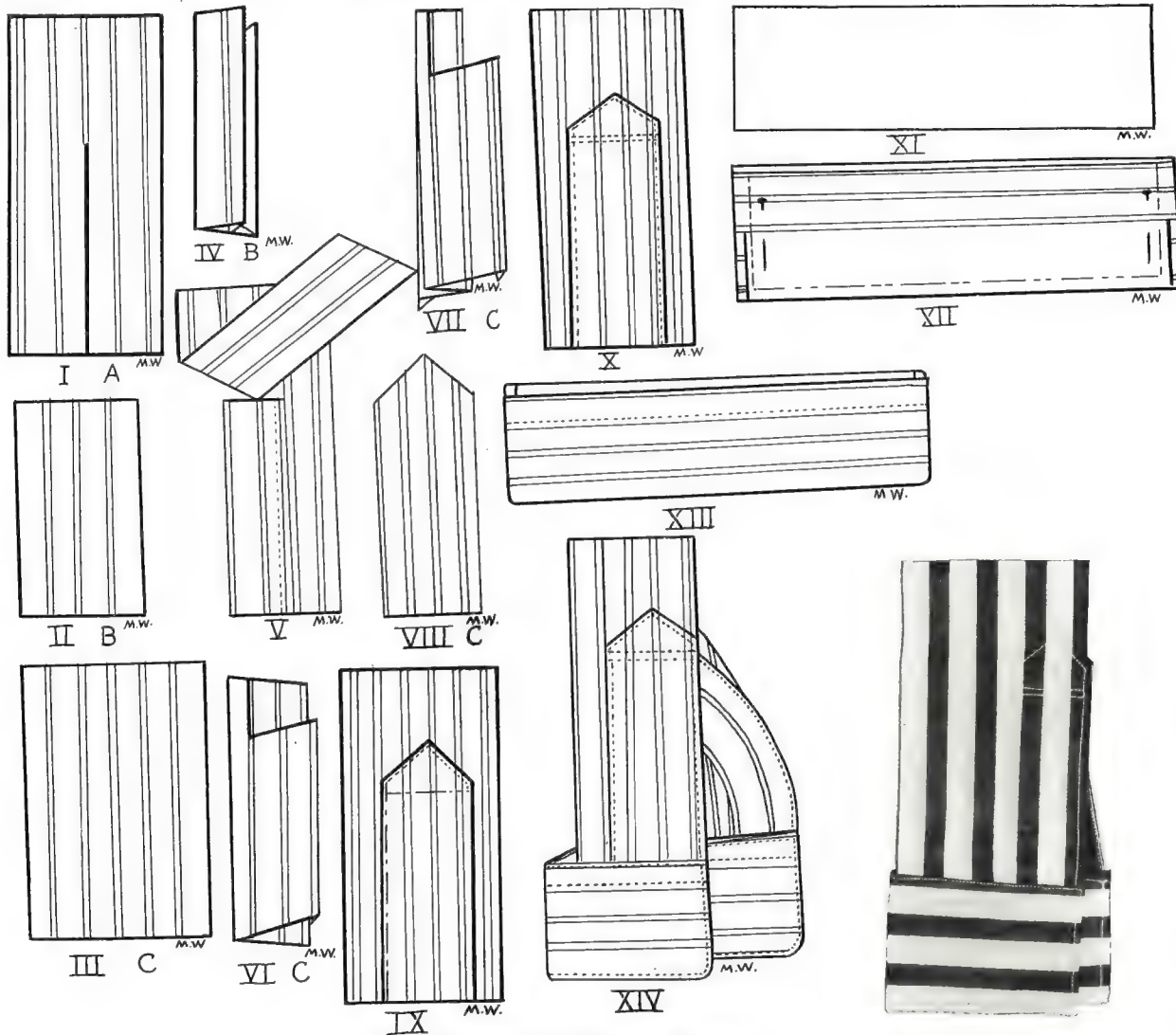
Piece B—2" wide and length of slit (which may be 4" or longer in sleeve). See Fig. II.

Piece C—3" wide and 1" longer than slit. See Fig. III.

out and press flat like Fig. VIII. On upper side of sleeve baste C, matching stripe or figure and having piece so placed that it will hide stitching on B. See Fig. IX. Stitch free edge about ¼" or less from edge, from *x* to bottom. Then in one stitching, without breaking thread, stitch other side and top of placket and twice across in such a way as to fasten C to B. See Fig. X.

Cuff.

Cut interlining width desired for finished cuff, lengthwise of goods (2"x7" in model). See Fig. XI. Lay right sides of material together and lay interlining on top. Cut ¼" longer than interlining and ¾" wider, (i. e. 2¾"x7¼"). Round or square corners as desired.



DETAILS OF PLACKET MODEL.

I use stripes in models that pupils may learn to match stripes in Piece C to those in Piece A. Cut Piece C from paper first; fold as directed, then mark on paper where stripes must come, then lay paper on cloth and cut as indicated by mark on paper C. All pieces must be lengthwise of goods.

Piece B—Fold long edges under ¼", lay folded edges together evenly, right side out, crease. See Fig. IV. On under side of sleeve (either side on model) place B. Baste securely and stitch. See Fig. V.

Piece C—Fold long edges under ¼", lay folded edges together evenly, right side out. On one side of piece ¼" from fold cut down far enough to take out a square. See Fig. VI. Now fold uncut side, back double and overcast raw edge from fold to edges and back (no knot in thread). Fasten and cut thread. See Fig. VII. Turn right side

Fold top piece of goods over lining and baste. Fold lower piece under so that it will show about ½" beyond edge of upper piece. Baste two parts together. See Fig. XII. Stitch and turn.

Stitch parallel to top of cuff about ⅜" from shorter edge. Tie ends. This leaves pocket for inserting sleeve and the one stitching on the outside is sure to catch the lower edge as it will extend beyond the edge on top of cuff. See Fig. XIII.

When inserting sleeve, find center of cuff and move ½" toward under part of sleeve and here place seam of sleeve. No gathers should come within ½" of sleeve seam. Place gathered sleeve in pocket of cuff, pinning securely. If links are to be worn, turn Piece B back before inserting sleeve in pocket. Baste securely. Stitch top of cuff, then around outer edge ¼".

BRIEF ITEMS OF INTEREST

HOW TO LAY FLAT AND GRADED COLOR WASHES.

George W. Koch.

SOME difficulty is usually experienced when beginning to use Water Colors, in laying the color washes satisfactorily. Before attempting work in this medium either for decorative or pictorial purposes, it is quite essential that one should have sufficient control over the medium to be able to lay a smooth flat wash as well as washes, grading evenly from the full strength of the color to clear water, or vice versa. A little time should, therefore, be given at the start, to the practice of laying both flat and graded washes. It would seem a comparatively simple matter to wash on a flat tone of a color and yet, unless the method of laying color washes is understood, trouble is sure to result; the tones will be uneven, spotty and streaky, and very likely the blame is laid to the paint.

The following directions are given to help those who have experienced difficulties in laying satisfactory color washes.

To Lay a Flat Tone.

Pin a sheet of 9" by 12" white drawing, or water color paper, to a board. Mix in a dish or on the palette of the color box a quantity of color of medium strength, being sure to mix enough paint to cover an area 3" by 6". (It is always well to mix rather too much than too little paint, since it is almost impossible to match a tone should the paint give out before the area is covered.) Hold the board slightly inclined, so that the color when washed will run downward. Dip the brush in the paint and fill it full. Make a stroke from left to right about three inches long. The paint will run downward and collect in a puddle at the lower edge of the stroke. Recharge the brush; beginning at the left and joining the lower edge of the first stroke, make a second stroke. This stroke will "pull down" the puddle which will settle again at the lower edge of the second stroke. Repeat the operation of charging the brush and pulling down the puddle until an area of about 3" by 6" is covered. Carry enough paint in the brush to always have a generous puddle at the lower edge of the wash. If too much paint collects, and the puddle threatens to break and run down over the paper, quickly make another stroke without recharging the brush. Never allow the puddle to run backwards by tipping the board. The puddle should always hang at the lower edge of the wash. In making a stroke, the brush should be pressed but very lightly against the paper. Indeed, the puddle may be pulled down over the surface without having the brush touch the paper at all. If the brush is pressed too firmly against the paper, the even deposit of paint left by the puddle is disturbed and streaks are the result. Having covered the desired area, let the brush absorb the surplus paint collected at the lower edge. The board should remain in an inclined position until the wash is dry.

To Paint a Graded Wash.

Mix on the palette, or in a dish, a small quantity of full-strength color. This mixture should be thin enough to flow readily. Proceed as before by charging the brush to the full and brushing on a stroke. Repeat this operation two or three times. Rinse the brush in clear water; add what the brush will hold of clear water to the mixture on the palette, and stir together. Fill the brush and proceed as before to pull down the puddle with two or three strokes. Again dilute the paint with a brushful of water and advance the puddle with two or three strokes. Continue diluting the paint after every second or third stroke, until the area 3" by 6" is covered. The tone will now show an even gradation from dark to light. To make an abrupt gradation, add more water at more frequent intervals. After diluting the paint, the mixture should always be stirred before a brushful is taken for the next stroke.

This method may be reversed by starting with clear water and gradually adding paint, until the full strength of the color is reached. After diluting the paint, the tip of the brush may be passed lengthwise thru the puddle once or twice before pulling it down, allowing the weaker mixture in the brush to blend with the stronger mixture in the puddle before the wash proceeds. This method will insure a perfect gradation and lines of demarcation will be avoided. If the puddle is allowed to remain too long in one place, the paint is apt to settle and cause a streak. It is, therefore, advisable to consume as little time as possible in laying a wash.

MANUAL ARTS AT BARABOO, WISCONSIN.

Walter H. McIntosh, Instructor.

BARABOO is the home of the great Ringling Circus, and we are somewhat imbued with the spirit of advertising, in offering views of some of the work being done in the city high school.

Early in the fall season of 1914 the manual training classes built playground apparatus for the three ward schools. This consisted of double sets of trapeze, swinging-rings, turning-bars and merry-go-rounds for the boys, teeter and overhead ladders, swings and merry-go-rounds for the girls, and a basketball court for both.

The kindergarten department gave the classes an order for forty chairs, mission style. The forty boys in the two classes, each made a drawing, and soon the forty chairs were out, stained, finished and delivered.

During the month of March, 1915, architecture and house and barn modeling were taken up. The sophomore class was organized into groups of four; a choice was given each, and the result was three distinct types of structures,—bungalows, wall-truss barns and poultry houses.

The freshmen were organized into groups of two. A modern cottage, measuring 20 ft. long, 14 ft. wide and 14 ft. high, was assigned to each group, the model to be constructed on a scale of one-eighth inch. Each group had its choice of style of roof and frontage. The result was a variety of models which all profited by.

The material for these models was ripped out of dimension stuff, 2 by 4 and 2 by 6, soft white pine, in lengths of six to eight feet. The students figured out the number of pieces, then cut the material to lengths wanted according to scale.

The lumber was sawed slightly larger than the scale, and then planed on all four sides. The boys used a planing board, a piece of pine three inches wide by three feet long with a hardwood block one-fourth inch thick glued on to one end for a stop. This gives a chance to



Class Constructing Model Houses and Barns.

use the jack and smooth plane without injuring the fingers, while handling the small studs and joist.

The school shop is fitted up with twenty sets of tools and benches. A five horsepower motor, a rip saw, and one lathe are all the machinery. The lathe is used to repair tools and carry the grinding wheel, and is used for numerous other purposes.

The instructor does all the sawing of material to convenient size for the student to work with, therefore, making the manual arts department strictly a handcraft shop. No planer, bandsaw or other machinery is used.

The time given to this work is two 45-minute periods each day. Tuesdays and Thursdays are given to draw-

The arrangements for Parents' Day and the preparation and installing of the exhibits were in charge of Mr. M. Norcross Stratton, Director of the Practical Arts Department.

TEACHERS OF AGRICULTURE.

THE demand for properly trained men to teach agriculture in secondary schools is greater than the supply and, from present indications, will continue to increase for some time. Hitherto, comparatively few men have studied agriculture with the deliberate intention of teaching it as a life work. In consequence, while provision for agricultural education has been greatly developed, the number of teachers is still small.



CLASS OF BARABOO BOYS MAKING KINDERGARTEN CHAIRS.

ing and the three other days to shopwork. Talks on forestry, iron and steel, cement working, patternmaking and painting are given. Much other work in a mechanical line is given to the school, and all students finish one or more pieces of useful furniture for themselves. So interested are they in the work, that they are not ready to quit when the clock on the wall strikes the noon hour.

INDUSTRIAL-ARTS WORK AT SPRINGFIELD.

AN interesting exhibit of industrial-arts work was held in December, at Springfield, Mass., in connection with a "Parents' Day" at the Chestnut Street School. The Parents' Day was arranged to give parents and friends of the school an opportunity to observe the work of the practical arts classes. About two hundred persons were in attendance during the day and evening.

The day's events included addresses, sample lessons and exhibits of actual work completed in the various classes.

A shop office where accurate time and cost records may be kept of the school jobs, has been opened in connection with the woodworking department of the school. The office is conducted in a businesslike way and is in charge of a student clerk. The clerk makes out the bills, receipts, shop orders and time slips and has charge of the office.

This subject is discussed in the *Agricultural Education Monthly*, published by the United States Department of Agriculture. It points out that a good teacher of agriculture must, of course, have all the fundamental qualifications. He must know his special subject and must also be versed in the science of education and the art of teaching. Those already qualified to teach general subjects in secondary schools who wish to teach agriculture should, if possible, take at least a course extending over several years in the state agricultural colleges. Those who cannot leave their positions can with very little trouble or expense take courses during the summer vacation or short courses during the winter.

A great deal of practical agriculture may also be learned by attending institutes and other farmers' meetings. If no such meetings are held in the teacher's district, he can assist in organizing them. Tho their primary purpose may be to aid the farmer, a receptive man cannot fail to learn much from the speakers that are invited to attend. In some States special sessions for teachers of agriculture are held in connection with state or county associations of teachers. Such meetings offer an opportunity for exchange of ideas and for keeping in touch with new methods, and offer stimulus and inspiration which the progressive man cannot afford to neglect.

THE NEED OF TRAINED DESIGNERS.

DR. JAMES P. HANEY, director of art in the high schools of New York City, points in a recent interview in *Women's Wear* to the great need of skilled workers in drawing and design for the industries of the United States. In writing of the situation as it is being met in New York City High Schools Dr. Haney writes:

"New York City needs industrial designers. We have schools and to spare producing painters of easel pictures, but our necessity is for a school which shall offer opportunity to the skilled artisan in any trade to learn the arts of design associated with that trade.

"Industrial art schools, with lavish equipment and ample support from state funds, were, before the war, to be found in every Continental city, because abroad, it is realized that skilled industrial designers are economic agents of immense importance in winning trade for the country which trains them.

"While our city has been slow in the development of an industrial art school, the art department of the high schools has taken steps to train both young men and young women workers in the essential elements of industrial design. The scheme for the boys is, as yet, only partly developed, but that for the girls is already in full operation.

"These industrial art classes for girls are held in the Washington Irving High School. That school includes among a great number of courses one especially arranged for art workers. In this course, a girl, after one year of high school training, is encouraged to study industrial art, if she shows talent. The course is two years long, the pupil devoting two-thirds of all her time to the study of drawing and design, and the balance to the study of English and related high school subjects.

"At the end of this training she is graduated, not as a finished designer, for the school does not assume to turn out finished designers, but as a student who has been taught to draw with great care, to design with some skill, to understand the principles of color harmony and, not least, to follow directions implicitly.

"From the first entrance of the pupil into this course, she is taught the immense value of intensive study and of accurate draftsmanship. For six months she does nothing but draw, first in pencil, then in ink, wash, and color. Following this, she gives another six months to the study of design. Her designs are never copies, but are always originally developed from motifs derived directly from nature. Those who have seen the work of these students agree that age for age they are now securing results which will compare favorably with the best obtained from similar students in any Continental school.

"After a year of this fundamental training, the worker is required to say whether she will specialize along commercial design and lettering, or as a costume illustrator. If she elects the former, she studies lettering with the same care that she has already devoted to the study of design. She works at many practical problems in which lettering and the development of decoration are combined. So far as possible, these problems are given to her just as they would be given in the trade. A 'rush order' is presented—a letterhead to be gotten out with a sketched decoration from a machine. Three or four suggested arrangements for the imaginary customer are required, all within a given time. The sketches are made and submitted, and after one of them is 'approved' the young designer is required to rush it thru to completion. Speed and accuracy are constantly emphasized, and questions of cost and the possibilities of reproduction are continuously brought before the pupil. Thus menus, brochures, car signs, advertisements and container covers of every description, are made and decorated, both in black and white and in color.

"If the student elects costume illustration, she is obliged to study for a year the techniques employed by the best workers in the trade. Her training is not the endless copying, but is work done directly from life. They learn artistic anatomy by the study of the living body and are then taught to clothe their sketches with the garments of the current mode. This lends their work a vivacity and spirit never present in the stiff drawings of those who construct their figures from conventional rules and proportions.

"In learning the techniques of illustration, the student works for some months in pencil, and then for months following that in pen and ink and wash, and that she may learn, not only the lay-out of a page, but the essentials of treatment of all the elements which go to form the page. As has been said, the school makes no pretensions to turn out perfected workers, but does seek to give careful basic training in each of the important forms of work which the illustrator must know."

The hasty and ill-advised commercial art worker often is heard to condemn the schools for their "failure to prepare pupils for practical work." What a commentary on this criticism is the actual work of this school. Every stroke done by these young industrial art workers is in practical preparation for work "in the trade." The critic sometimes goes further and asserts that the art teachers of the schools are both ignorant and indifferent as to what is done in the commercial studio. Here another error is made. The teachers of these industrial art classes are continuous students of what the trade needs and desires. A "Survey" of the opportunities open to women in the art trades is being made by the art teachers of the Washington Irving High School.

The art teachers are anxious to know exactly the conditions which maintain in the studios of novelty manufacturers, lace makers, carpet makers, textile manufacturers, wall-paper printers and the hundred other art trades which make up the field in New York. They are not only anxious to know the needs of these trades, but are anxious to adapt their work to meet these needs, so that the students under them shall find openings in which their training will gain them ready and steady employment. Specialists the art teachers know they cannot turn out, nor would they wisely do so if they could. What would it profit a student to specialize as a silk or lace designer, if, when she left the school, she found that there was not an opening for her particular specialty in all the city. But if specialists cannot be made, all students may be trained by teachers who know trade conditions well, so that each may readily become a specialist in any commercial studio which has a director, anxious to forward his young artists along special lines.

The preparation of boys is going on in the High School of Commerce, and in other high schools for boys, but one cannot tell about it in a paragraph.

INDIANA VOCATIONAL SURVEY.

THE INDIANA BOARD OF EDUCATION has appointed Mr. Charles H. Winslow, of New York City, to conduct an industrial survey of a number of communities in the state, as a basis for the establishment of vocational training.

In the conduct of the survey, which is to be begun at Terre Haute, it is the purpose of the state board to determine facts necessary or helpful for the organization and development of vocational instruction in the public schools. In the investigations, typical communities will be selected, and the school and city authorities will be urged to create an interest in the work and to co-operate with the experts in gathering information. The communities studied will be asked to bear a part of the cost of the undertaking and to carry out as rapidly as possible the recommendations of the board for vocational training.

It is the opinion of the state board that a thoro study of the industries and needs for vocational training in selected communities will make it possible to work out the problem in a successful and comprehensive way. The communities studied will be made typical examples for the rest of the state.

An important part of the survey will be the effort to arouse interest in vocational training. A number of conferences have been planned with employers of labor and employes, to enlist their co-operation and assistance in providing vocational training for the occupations and trades in which the people are engaged. The survey will also seek to determine how young people can best be prepared in all-day vocational schools for specific occupations and trades; how best to provide for a part-time plan of instruction for those who have withdrawn from school and gone to work, which will fit them for profitable wage-earning in some useful field, and to furnish evening vocational schools for the instruction of adult workers.

NEW BOOKS AND PAMPHLETS.

Written English.

By Edwin C. Woolley. 321 pages. Price, \$1.00. D. C. Heath & Co., New York and Chicago.

In this volume, the author has tried to meet the requirements of the modern teacher of English composition and to correct many of the shortcomings of the present day school English. His method has been to present the five leading principles of mechanical accuracy in writing, namely, manuscript arrangement, grammatical correctness, punctuation, spelling, and conventional usage in letter-writing. The clearness of the principles, the abundance of material for drill purposes, and the numerous and well selected illustrations make the book a most valuable one for teachers of students interested in the writing of good English.

Clay Modelling for Infants.

By F. H. Brown. 120 pages. Price, 75 cents. Isaac Pitman & Sons, New York, N. Y.

This book on modelling is suggestive for teachers in the grades who wish to have the children work in clay. The book is written by an Englishman, and some of the terms used, and some of the exercises suggested have particular significance and appeal to English people.

The work is kept within the possibilities of grade work, and good advice is given on the use of clay as a medium of expression with children. Seventy-nine exercises are described and illustrated by photographs of models made under Mr. Brown's instruction.

Manual Training Outlines. By Milton Clauser, Supervisor of Manual Training, Salt Lake City, Utah. Price, 25 cents. Published by the author at Salt Lake. A helpful pamphlet outlining woodworking courses for the 5th, 6th, 7th and 8th grades. The courses are particularly strong in requiring initiative on the part of the pupil, attention to design as correlated with mechanical drawing, mathematics and handwork.

Proceedings of the First National University Extension Conference. J. J. Pettijohn, Secretary, Indiana University, Bloomington, Ind. This volume contains a complete report of the papers and discussions of the first National Conference, which was held in Madison, Wis., March 10 to 12, 1915.

Catalog and Synopsis of courses given at the United States Indian School, Carlisle, Pa. The booklet was made into printed form by Indian student-apprentices of the school as a part of their regular training. The initials, head pieces, borders, and imprints were designed by students of the Native Indian Art Classes and illustrate the practical adaptation of Indian Art to handicraft decoration.

Shopwork in Elementary Schools. This report of Walter S. Goodnough, superintendent of shopwork in



Getting Practical Experience. Students of the Aberdeen, S. D., High School Building a Chicken Coop for a Farmer.
Mr. Claude W. Knott, Director.

Elementary Schools, New York City, covers the school year 1914-15.

The Boot and Shoe Industry in Massachusetts as a Vocation for Women. Bulletin of the United States Bureau of Labor Statistics 180. This investigation was made in the year 1911-12 by three experts in the Women's Educational and Industrial Union of Boston. It analyzes the social and economical condition of the chief shoe centers of Massachusetts, describes accurately the nature and condition of women's work in these factories, the wages of women shoe workers, the annual earnings and the special conditions affecting the earnings, efficiency and social status of women shoe workers. The report will be of interest to teachers in vocational schools and to teachers of vocational guidance.

THE CONVENTION OF THE WESTERN DRAWING AND MANUAL TRAINING ASSOCIATION.

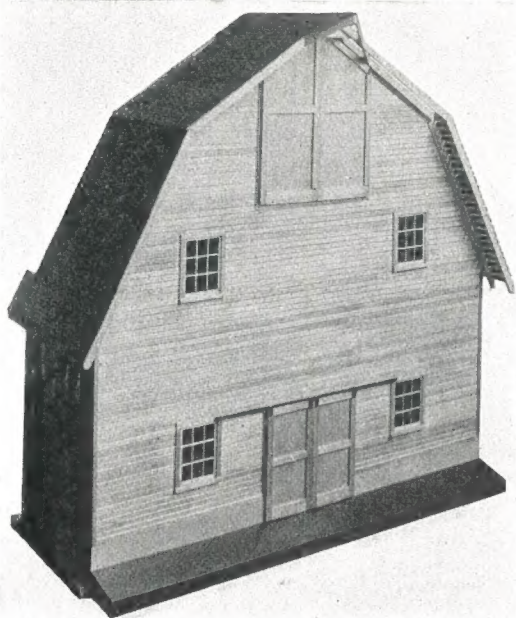
THE 23rd annual meeting of the Western Drawing and Manual Training Association, which will be held May 3, 4, 5 and 6, at Grand Rapids, Michigan, promises to be one of the largest and most inspiring ever held by the Association. It is predicted that the attendance will reach the twelve hundred mark. Michigan will furnish fully five hundred teachers, and one city alone has promised one hundred members.

The new Pantlind Hotel will be the convention headquarters, where the registration bureau and the business of the meeting will be conducted. The general sessions and the exhibits will be located in the Klingman Furniture Exposition Building, the entire ground floor of which has been turned over to the association for its unrestricted use. The exhibit space which is the largest ever devoted to exhibit purposes, covers more than 35,000 square feet of floor area. The headquarters, and the meeting and exhibition rooms are only one block apart, making them easily accessible.

The program which is in preparation, will be especially interesting and helpful to teachers of the manual arts. Governor Ferris of Michigan, Arthur D. Dean, chief of the Division of Industrial Education, New York State, of Albany, N. Y., Dr. C. A. Prosser of Dunwoody Institute, Minneapolis, Minn., and Dr. James P. Haney of New York City, will address the teachers. Mr. Lorado Taft, will speak on "Privileges and Penalties of Our Task."

A number of well-known specialists in the manual-arts field will speak on problems peculiar to their work. There will also be a number of round tables, conducted by some of the best known teachers in their line.

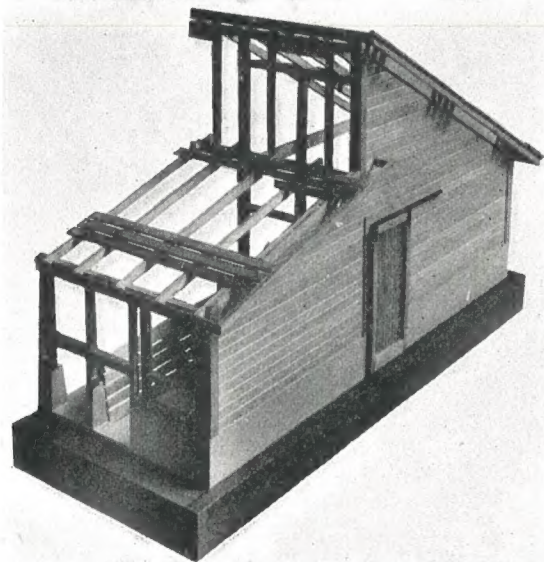
Mr. S. J. Vaughn, president of the Association, will be glad to furnish any member a copy of the Bulletin, just issued, describing the meeting and the speakers. Requests should be mailed to Mr. Vaughn at DeKalb, Ill.



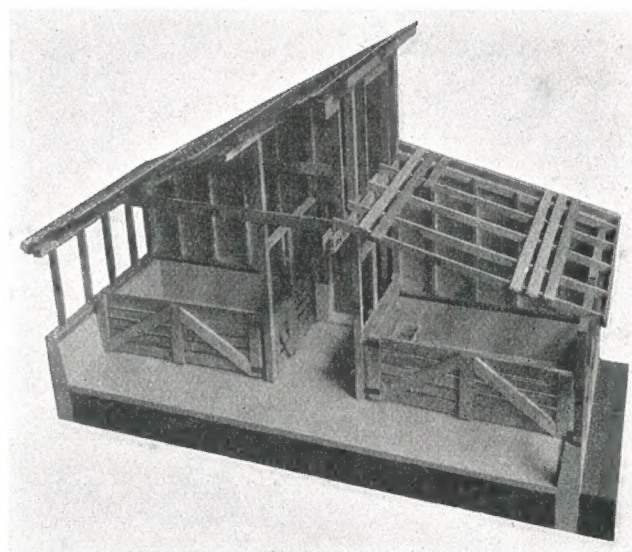
Exterior of Barn.



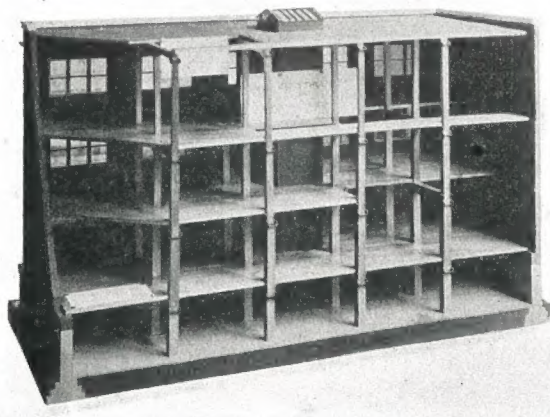
Interior of Barn.



Exterior of Hog House.



Interior of Hog House.



Interior of Mill-constructed Building.

MODELS SHOWING CORRECT WOOD CONSTRUCTION.

The models illustrated above were prepared by the National Lumber Manufacturers' Association and are being shown at industrial exhibitions thru the courtesy of the Extension Division of the Association. The models are correct in every detail and are fully marked with the dimensions of the lumber to be used in constructing similar full-size buildings. The models are particularly suggestive for similar work which may be undertaken in manual training shops.

NOW, ARE THERE ANY QUESTIONS?

This department is intended for the convenience of readers who may have problems and questions which trouble them. The editors will reply to questions, which they feel they can answer, and to other questions they will obtain replies from persons who are competent to answer. Letters must invariably be signed with full name of inquirer. If an answer is desired by mail, a stamped envelope should be enclosed. Address, Editors, Industrial-Arts Magazine, Milwaukee, Wis.

Sanding Machine.

317. Q:—I want some kind of a sanding machine. The hand drum and disc sander never seemed satisfactory to me, and I would like to know if there is any place where a Belt Sander, small enough for a manual training shop, is made.—R. C. W.

A:—The Bentel & Morgedant Belt Sander, No. 305, 16" will serve your purposes. It is sold by the Oliver Machinery Company, Grand Rapids, Mich.

Cane Weaving.

321. Q:—In the February (1915) issue of your magazine you gave an article on cane weaving. I wish to do some cane weaving but do not know where to get the cane. Would you please tell me where I could secure the necessary material?—H. A. E.

A:—In the Southwest, Hoover Bros., Kansas City, Mo.; in Chicago, Everett Frain, 723 S. Fifth Ave.

Philippine Examinations.

322. Q:—In order to take the examination to teach in the Philippines, what credentials are required, and where are the examinations held?—M. T. T.

A:—The requirements for Civil Service Examinations for teaching positions in the Philippines are too long to be quoted in this column. They may be obtained by writing to the United States Civil Service Commission, Washington, D. C. Ask for Circular 17, Philippine Civil Service Examinations. In general, applicants for the examination must have had experience in teaching. If a position as industrial teacher is desired, applicants must have experience in teaching the trades or school training in them. The age limits are 20 and 40 years.

The examinations will be held in 405 cities of the country. In Wisconsin, they will be held in Appleton, Ashland, Chippewa Falls, LaCrosse, Madison, Marinette, Milwaukee, Superior and Wausau.

Riding Spurs.

323. Q:—Can you give me information regarding the making of riding spurs? What material should be used, what size, and how are they forged?—L. M. K.

A:—In answer to the question on how to make spurs, I will say that there are many different kinds of spurs in use. Spurs can be made very simple or very decorative, with chasing and inlaying. Perhaps the simplest kind is best for a boy to start on.

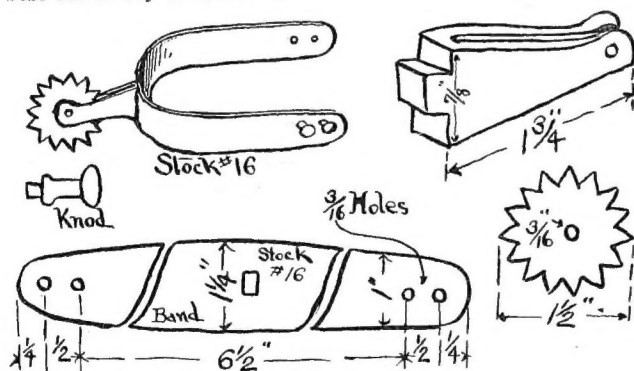
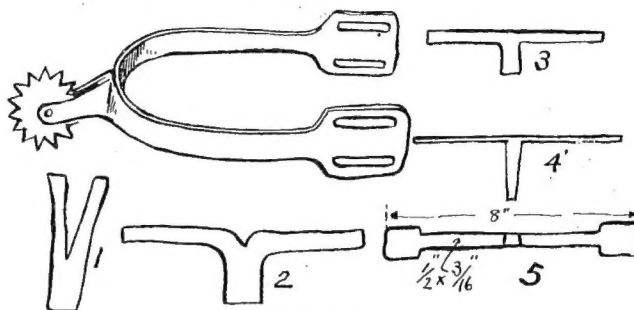


Fig. I.

In Fig. I are shown drawings for a very simple spur. The stock can be soft steel, No. 16 gauge. Spring steel would be better but it is harder to work. For the first attempts, use soft steel. The lug which holds the spur wheel is riveted to the band. The stretchout of the band is shown in the drawing with the holes located. Four knobs must be riveted on to the band for buttoning the straps by which the spur is to be buckled to the foot. The band is then riveted into shape and the shank is riveted in place. A slot is then sawed in the shank to receive the spur wheel. The wheel is riveted in place.

Another kind of spur is shown in Fig. II. In making this spur, a piece of soft steel large enough is heated and split on the end as indicated at drawing 1. The split parts are then bent at right angles as shown at 2. They are then shaped somewhat as shown by the drawings 3, 4 and 5. Four slots are made in the ends for straps, instead of the knobs shown in the first spur. These slots can be made



[Fig. II]

by drilling holes thru the metal, then cutting out and filing. The spur wheel can be made from thin stock and the teeth filed, or it can be machined.—T. F. Googerty.

Still Life Models.

324. Q:—What firms furnish inexpensive still life models, pottery, cheap baskets?—E. K. J.

A:—Still life models for school use are carried by The Prang Company, Boston; Atkinson Mentzer & Company, 30 W. 36th St., New York, N. Y.; Devoe & Raynol's Company, 101 Fulton St., New York City; F. Weber & Company, Philadelphia, Pa.; The Thomas Charles Company, 207 N. Michigan Ave., Chicago.

The Rookwood Pottery, Cincinnati, makes splendid pottery. The Basketry Shop, Bellefonte, Pa., makes high-grade baskets.

Book on Basketry.

327. Q:—Kindly inform me where I can procure Mary Miles Blanchard's book on Basketry, which has been mentioned in the INDUSTRIAL-ARTS MAGAZINE.—M. E. R.

A:—Mrs. Blanchard's book on "Basketry" is published by Charles Scribner's Sons, New York City. It sells at \$2, net.

Tooled Leather Work.

328. Q:—I do tooled leather work—will you please tell me where I can get buttons (button fasteners) in variety. I make up card cases, etc., and want to set my own buttons? I want some simple device for setting.

Can you give me addresses where I could have tooled leather work made up if I wished to do so?—C. H. T.

A:—The M. F. Davis Leather Co., 65 E. Washington St., Chicago, Ill., do all kinds of making up and mounting tooled leather work, and can furnish buttons and other fixtures.—S. J. V.

Lantern Slides for Woodworking Classes.

331. Q:—Can you put me in touch with a firm handling slides for lantern or projector, illustrating processes in elementary woodwork?—T. G. L.

A:—While slides exist and are in the possession of teachers and supervisors, no firm is making a business of supplying slides illustrating the processes of elementary woodwork.

Book on Knotting and Splicing.

332. Q:—I would like a copy of "Knots, Splices and Rope Work" by A. H. Verrill but do not know where to send for it. I shall be very grateful for information.—W. C. M.

A:—The book mentioned above is published by N. W. Henley Co., 132 Nassau St., New York City. The price is 60 cents.

Series of Books on Woodwork.

334. Q:—Is there a series of textbooks on woodwork published at Muncie, Ind.? If so, will you please give me the name of the firm?—J. W. S.

A:—Yes; the Muncie Normal and Industrial Institute.

Magazines on Woodworking.

336. Q:—Will you kindly send me the addresses of the publishers of trade papers relating to Woodworking and Milling?—F. S. P.

A:—The following publications may be of assistance to you in securing reading matter on the subject in which you are interested.

Furniture Manufacturer and Artisan, Grand Rapids, Mich. Monthly. \$1.00 per year.

American Cabinet Maker, New York City. Weekly. \$1.50 per year.

Craftsman, New York City. Monthly. \$3.00 per year.

Upholsterer, New York City. Monthly. \$2.00 per year.

Building Age, New York City. Monthly. \$2.00 per year.

American Lumberman, Chicago, Ill. Weekly. \$4.00 per year.

Veneers, Indianapolis, Ind. Monthly. \$1.00 per year.

Books on Elementary Carpentry.

337. Q:—Will you give me the names and publishers of some good book on elementary form of carpentry? I want a well illustrated book that goes into details.

A:—Constructive Carpentry, King. (American Book Co., Chicago). Problems in Carpentry, Roehl. (Webb Publishing Co., St. Paul, Minn.)

Leather Working Materials.

338. Q:—Where can one get tools, leather, dyes, wax, etc., for leatherwork, suggested by Mr. Vaughn's article?

A:—Tools, leather, etc., may be bought from Orr & Lockett Hdw. Co., Chicago, and A. H. Abbott & Co., Chicago; Wilder & Co., 226 W. Lake St., Chicago, are specialists in fancy leather.

Books on Sheetmetal and Concrete Work.

340. Q:—We are doing some work in sheetmetal, also some work with cement in the grades. I would like to improve the work by the addition of some new models along these lines. Could you tell me of some books that I could get that contain drawings of simple models in sheetmetal and concrete work, also prices of same?—E. L. D.

A:—The following list of references contain drawings and suggestions for sheetmetal and concrete problems in the schools:

Sheetmetal.

Practical Sheetmetal Work and Patterns. 12 vols. \$1.50 ea. \$15 complete. Grand Rapids Furniture Record Co., Grand Rapids, Mich.

New Metal Work Pattern Book. By Kittridge. Price, \$5. David Williams Co., New York City and Manual Arts Press, Peoria, Ill.

Sheetmetal Drafting. By L. C. Dewey. \$1.25. Dewey Blueprint Co., Denver, Colo.

Practical Sheet and Plate Metal Work. By E. A. Atkins. \$2. The Macmillan Co., 64 Fifth Ave., New York, N. Y.

Concrete.

Concrete Pottery and Garden Furniture. By R. C. Davidson. \$1.50. Munn & Company, 361 Broadway, New York, N. Y.

Manual Training Course in Concrete. Price, 25 cents. Association of American Portland Cement Manufacturers, Philadelphia, Pa.

Practical Cement Work. By Henry. Price, 50 cents. Building Age, Book Dept., 239 W. 39th St., New York, N. Y.

Manual of Reinforced Concrete and Cement-block Construction. Price, \$2.50. D. Van Nostrand & Co., 25 Park Place, New York City.

Ornamental Cement Work. By O. Wheatley. \$2. D. Van Nostrand & Co., New York City.

Cement and How to Use It. By Radford. Radford Architectural Co., 1827 Prairie Ave., Chicago, Ill.

Cabinet Woods.

341. Q:—Where can wood for inlay work be had?—E. L. D.

A:—Everett Frain, 723 S. Fifth Ave., Chicago, makes a specialty of cabinet woods for school use.

Finishing Sweet Gum.

337. Q:—I have a dressing table of sweet gum now under construction. What is considered the most appropriate finish and how is it obtained? Would you advise using acetate of iron stain? If so, in what proportions should it be mixed?—C. D. P.

A:—1. Finish natural, with two coats of white shellac, and two coats of varnish, rubbed dull.

2. Apply a solution of one part of boiled linseed oil, to two parts of naphtha (gasoline) to the surface with a piece of cheesecloth. Allow twenty-four hours to dry, and follow with two coats of white shellac, and two coats of varnish rubbed dull.

Number 1 will be found satisfactory when the markings on the gum are prominent. Number 2 is a good method when the markings or figures require some treatment to intensify them. Apply solution warm.

Would not advise using acetate of iron stain. If you wish to use stain a weak solution of a fumed stain will be about what you will want. Gum, however, is usually finished natural.—J. M. Dorrans.

NEWS NOTES.

THE WASHINGTON STATE FEDERATION OF LABOR has recommended that the legislature, at its next session, be asked to appoint a commission to conduct an industrial survey of the state. The request for the survey was made at the annual meeting of the Federation at North Yakima, and followed an address by President E. P. Marsh, on the need for vocational training in the schools.

CRESTON, IOWA. The Manual Training department of this place which is under the supervision of S. M. Law has just completed the equipment for the sewing room in the High School Building.

The combined tables and drawer cabinets, of which there are six, consist of tables 40x60 inches with cabinets below the top containing 16 drawers, each utilizing to good advantage the limited floor space.

The design is original with Mr. Law and is well adapted to local needs. The cabinets were constructed at a saving of not less than \$150.00.

THE TORCH is the name of a "Journal of inspiration for those who work for advancement" which is written and edited by the classes in journalism, advertising and salesmanship of the vocational night school and printed by the pupils of the prevocational school in the interest of vocational education in the public schools of Richmond, Va. Its size and make-up are somewhat unusual for a school publication and offer suggestions to other publications of a like nature. W. H. Magee is Director of Industrial Education and we presume those interested may secure a copy by writing to him.

STANDARD REQUIREMENTS FOR RECEIVING A MACHINIST'S CERTIFICATE from Cass Technical High School, Detroit, is the first sheet of the kind which we have seen. It gives in tabular form the work which is required of a pupil before a certificate is granted. It allows for work which may have been done out of school, and has been made to fulfill the requirements of the trade. It represents an effort to standardize the machinist's trade in Detroit and is an indication that Cass Technical High School is taking the leadership in trade instruction of the city. The management of the school has made arrangements to give all applicants an examination covering the work outlined in the schedule, and those who can qualify and can show not less than two years of practical shop experience with one company will be given a machinist's certificate by the Board of Education. E. G. Allen, Director of the Mechanical Department, is the person to whom inquiries should be addressed.

THE STATE TRADE SCHOOL at Hartford, Conn., will shortly be discontinued. An arrangement has been made whereby the students will be transferred to the new Vocational High School.

DANSVILLE, N. Y. A farm demonstration school was recently held at the high school under the auspices of the New York State College of Agriculture. The men's classes studied soil fertility, stock raising and plant diseases. The women's classes devoted their attention to a study of foods and the cooking of well balanced meals.